

IMPLICIT BIAS IN THE UK: UPDATING THE IMPLICIT ASSOCIATION TEST

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ABSTRACT

Background. Implicit biases are responses that are influenced by automatic or unconscious attitudes, prejudices and stereotypes. They have been implicated in discriminatory thoughts, feelings and behaviours towards other groups of people, which can differ from the individual's endorsed beliefs. Trainee Clinical Psychologists (TCPs) work with diverse populations and are increasingly encouraged to demonstrate leadership on service level issues. It should therefore be considered whether biases outside of their awareness may impact their therapeutic work and other professional decisions.

Methods. A cross-sectional quantitative design was employed to compare the performance of 28 TCPs on the Implicit Association Test (IAT; a measure of implicit bias), to that of 171 members of the general population. New stimuli were created to address identified limitations in skin-tone, age, weight and sexuality categories, and a new category measuring transgender bias was developed.

Results. TCPs showed less bias overall than the general population, but these differences diminished once age and gender were accounted for. The highest level of bias in both groups was preference for light skin ($D = -.42$). Trainees self-reported less bias against marginalised groups, resulting in a greater discrepancy between self-reported and implicit bias amongst TCPs. Initial findings supported the validity of the Gender Identity IAT ($\eta^2 = .137$, $p < .005$).

Conclusions. This study highlights the importance of rigorous IAT design and suggests ways in which measures can be improved and updated, as exemplified by the Gender Identity IAT. The discrepancy between trainees' self-reported bias and IAT scores have implications for clinical training, should they be replicated with a larger sample. Although further research is needed to establish how implicit bias scores translate to observable real-world behaviour, trainees should be encouraged to reflect on the potential impact of their biases on therapeutic work and service provision.

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1. INTRODUCTION

1.1. Chapter Overview

This chapter places the literature on implicit bias in its historical and socio-political context. The definition of the concept and clarification of terminology lay the groundwork from which its evolution in the public and academic spheres can be explored. Methods of measuring implicit bias are outlined with a particular focus on the Implicit Association Test (IAT). The strengths and limitations of this measure, as well as the ongoing debates that surround it, provide a case for why further research in the area is warranted. A consideration of the relevance to clinical psychology contributes to the aims and rationale for updating elements of the IAT.

1.2. Definitions

A number of terms have been used to characterise the construct at the heart of this thesis. *Implicit bias* has become a common descriptor in the psychological literature (Amodio & Devine, 2006), extending to other fields including law (Jolls & Sunstein, 2006) and organisational studies (Jost et al., 2009). Along with the term *unconscious bias* it has also gained increasing traction in public discourses (e.g., Yudkin & Van Bavel, 2016). The following sections will consider different aspects of the label.

1.2.1. What is Bias?

Greenwald and Krieger (2006) define bias as denoting “a displacement of people’s responses along a continuum of possible judgements” (p.950). They point out that this needn’t necessarily be problematic, offering the example of two tutors who differ in the leniency of their marking, but do so consistently with equal sensitivity to differences among students’ performance. In this scenario, in the absence of established standards linking specific performances with specific marks, one tutor cannot be described more “accurate” or “fair” than the other. A more widely recognised characterisation of bias is a negatively

connoted one in which, for example, a tutor awards different marks to two students who perform identically but differ on another characteristic such as their gender or ethnicity. It is with this aspect of bias, in which the accuracy and fairness of judgements are compromised, that this study is primarily concerned.

Consequently, bias can be understood throughout this thesis as an umbrella term (De Houwer, 2006) which incorporates other related constructs of *implicit social cognition*, the term conventionally designated to this area of psychological research (Hahn & Gawronski, 2018). These constituent mental phenomena include attitudes, prejudices and stereotypes (Rudman 2004) and are commonly conceptualised in terms of mental association (Greenwald et al., 2002). The construct of attitude can thus be thought of as the mental association between an object and a positive or negative evaluation (e.g., flowers and good). Prejudice on the other hand refers to the mental association between a social group and a particular evaluation (e.g., fat people and bad). Stereotypes can be further distinguished as the mental association between a social group and an attribute (e.g., old people and slow). Stereotypes may be accurate on a group level, but do not apply to each individual in that group (Amodio & Devine, 2006). The term *bias* was chosen for the title of this thesis to capture this encompassing breadth of meaning, and to acknowledge that this study positions itself within the wider body of research ultimately concerned with real-world outcomes, in a way that a term such as *cognition* might not convey.

1.2.2. What makes it Implicit?

Researchers have generally differentiated implicit attributes from their explicit counterparts, in order to convey that the assessed attributes cannot be consciously accessed or controlled by the individual (e.g., Fazio & Olson, 2003). However, the term *implicit* has also been used to describe the type of instrument employed to measure this attribute itself (De Houwer, 2006). In an effort to clarify the nomenclature, De Houwer, Teige-Mocigemba, Spruyt, and Moors (2009) proposed a distinction in the words used to describe the measurement instrument and the measurement outcomes. Following their definition, which is adopted in this thesis, *implicit* refers to a measured construct (e.g., bias) influencing the observed outcome in an automatic fashion, i.e., when

the impact of bias on an individual's responses is automatic, unintentional, unconscious, or uncontrollable. Conversely, measured bias should be termed *explicit* when it influences the observed outcome in a controlled fashion, i.e., when the impact of bias on responses is intentional, conscious, or controllable (Hahn & Gawronski, 2018). The measurement instruments used to capture these constructs are termed *direct* when based on self-assessment and *indirect* when not (e.g., when based on the speed of response following presentation with a stimulus). *Implicit biases* can therefore be conceptualised as discriminatory biases influenced by automatic or unconscious attitudes, prejudices and stereotypes. They are especially intriguing as they may produce behaviour that diverges from an individual's endorsed beliefs (Greenwald & Krieger, 2006).

1.2.3. Other Definitions

This dissertation is concerned with bias toward individuals, groups and communities who can be conditionally considered *marginalised* (Whitehead, 2007). As the use of language can be argued to reinforce such marginalisation (Riggins, 1997), it requires thoughtful consideration. The term *race* is placed in inverted commas or italicised throughout¹ to acknowledge its ill-defined nature and limited use as a descriptor of biological human difference (Hocutt, 2002). *Minority ethnic* is used to refer to people who identify as part of cultural/ethnic group other than the majority group of that society. In the UK, this predominantly refers to people of South Asian, African, and African Caribbean origin (Office of National Statistics [ONS], 2016). When the terms are used to refer to a person or a group of persons, the words *Black* and *White* will be capitalised in acknowledgement of the cultural associations they entail (Thompson, 2004).

For conciseness, the term *gay* will encompass gay men and lesbian women when referring to a gay/straight distinction. The term *trans* will be used synonymously with the term *transgender* to reflect current usage (Gender Identity Research & Education Society [GIRES], 2015). The terms *cisgender* and *cis* (i.e., non-trans) will be used in a corresponding manner. *LGBT+* is used

¹ Except when part of an official title, e.g., Race Relations Act

to refer to the many sexual and gender identities which fall outside the majority identities of cisgender and *heterosexuality* (Erby, Henry, Lopez, Procter & Robinson, 2016).

1.3. The Societal Context

1.3.1. Inequality

Social inequalities remain pervasive in the UK. Despite numerous developments in anti-discrimination law over the past decades (incorporated in the Equality Act, 2010), disparities in outcome between socially defined categories of people (differentiated by, e.g., age, gender, ethnicity) are seen in many areas from education (Equality Challenge Unit [ECU], 2013) to health (Public Health England, 2017). The fact that these inequalities have been identified by government as a problem to address and legislate against, suggests a shift in societal values from a time in which wide disparities (and biases) were deemed acceptable. A historical view of the legislative development reveals that an increasing number of categories have been incorporated over time to increase the protection and rights of minority groups. A pertinent example of this is transgender rights. From lacking official recognition for much of the 20th century, trans people in the UK have gradually been afforded greater rights since the 1990s. These rights have encompassed documentation and marriage, with the Equality Act 2010 officially adding “gender reassignment” as a protected characteristic to prevent discrimination in education, employment, housing and services.

This observed shift has been broadly reflected in self-report studies such as the British Social Attitude survey (National Centre for Social Research [NatCen], 2017), in which a representative sample of over 3,000 people from across the UK are interviewed on a range of subjects. The survey, which has been conducted annually since 1983, is a valuable source of information on the public’s attitudes due to its in-depth interview questions. However, it is important to note that the data are the result of face-to-face self-reports, and that the impact of factors such as social desirability and the identity of the interviewer are unknown. An example of apparent societal shifts in attitude can be seen in

the reported views of same-sex relationships: The most recent survey in 2017 found that 64% of respondents considered same-sex relationships “not wrong at all” compared to only 17% when the survey was first conducted in 1983.²

1.3.2. Bias as a Cause of Inequality

It is an uncontroversial assertion that overt discrimination against certain groups contributes to observed inequality by denying members of those groups opportunities available to others (Brown, 2004). Examples of this overt bias exist for much of UK’s history. They include the refusal of companies to employ minority ethnic workers (addressed by the Race Relations Act 1976) and the criminalisation of homosexuality under the Sexual Offences Act until 1967, which left many vulnerable to receiving a criminal record with further exclusionary consequences. Pettigrew and Meertens (1995) argued that the observed decline in “blatant” and official discriminatory behaviours did not result in an elimination of bias, but rather that these have been supplanted by less overt, “subtle” forms of discrimination.³ These “modern” forms of prejudice (Brief, Dietz, Cohen, Pugh, & Vaslow, 2000) supposedly operate with the knowledge of the social undesirability of voicing explicit biases. A large body of field experiments (review by Riach & Rich, 2002) supports the view that discriminatory behaviour and unfavourable judgements (e.g., about housing and employment) thus continue to disadvantage members of certain groups. The main difference between this and more overt forms of bias is that individuals will give reasons for behaving a certain way which are not explicitly linked to group identifiers (e.g., “he seemed arrogant” as opposed to “because he was fat”; Byrd, 2011).

1.3.3. The Role of Implicit Bias

Developments in implicit social cognition research⁴ have more recently led to greater public familiarity with the concept of implicit bias. This has added further subtlety to the different ways in which bias can be conceptualised. The two previously described blatant and subtle forms may be seen to depend on the

² However, not all self-reported attitudes have seen the same level of change (e.g., “race”; Kelley, Khan, & Sharrock, 2017).

³ This is not to minimise the overt hostility and abuse that many continue to experience.

⁴ Covered in section 1.4.

view that this bias is in line with one's personal beliefs, even if social norms prevent public acknowledgment of these. However, the concept of implicit bias opens up the possibility of thinking and acting in a biased manner even when this is in opposition to one's values and without being consciously aware of the process (Greenwald & Krieger, 2006).

Recent media attention in the UK has been preceded by greater public exposure in the US, starting around the mid-2000s. This coincided with a national debate around the impact of "racial" attitudes on the government's response to Hurricane Katrina, as well as the ongoing issue of police shootings (Henkel, Dovidio, & Gaertner, 2006). The idea that "racial" bias could be automatic and unconscious reached large audiences via popular science books (e.g., Gladwell, 2005), mainstream media (Vedantam, 2005) and television talk shows (e.g., *The Oprah Winfrey Show*; Winfrey, 2006). A decade later the subject received its widest coverage to date when implicit bias was mentioned as a factor in police killings by one of the candidates in a nationally televised presidential debate (Blake, 2016). Although the UK public has not received the same degree of exposure as their US counterparts, the topic has received increasing coverage in national media (e.g., Edmonds, 2017) as well as influencing the policies of charities and educational institutions (ECU, 2013).

Repeated findings of biased decision-making in recruitment processes (e.g., Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012; Reuben, Sapienza, & Zingales, 2014) have led to fundamental changes to hiring procedures in many organisations. These have typically aimed to keep to a minimum the amount of non-essential personal identifiers available at to recruiters so as to avoid activating held stereotypes. A further recent development to have reached the UK from the US is "anti-bias training" (Clegg, 2017), which aims to reduce employees' implicit biases by bringing them into conscious awareness.

These examples demonstrate how the consideration of implicit bias in the public sphere has broadened its scope beyond "race"-related bias and been applied to other pertinent issues of social inequality, such as the gender wage gap. Kelley

et al. (2017) argue this offers an important addition to public debate which often focuses on either extreme forms of prejudice such as hate crimes, or more abstract impersonal concepts such as institutional bias. By considering the cumulative effect that individual implicit biases can have, proponents suggest that steps can be taken towards reducing the number of situations in which it can further contribute to the inequalities we observe (Greenwald, Banaji, & Nosek, 2015).

1.4. Researching Implicit Bias: An Overview

Following the preceding section's overview of how bias and its impact on inequality have been perceived in the public arena, the following section will explore the conceptual origins and development of implicit social cognition in the research literature. The efforts to standardise the variety of terminology alluded to in 1.2.2. (e.g., the interchangeable use of *automatic*, *unconscious* and *implicit*; De Houwer et al., 2009) point to the two separate intellectual traditions from which study in this area arose (Payne & Gawronski, 2010). The first of these is found in the research on automatic processes in attention, while the second grew out of research on implicit memory.

1.4.1. Attention Research: Automatic and Controlled Processes

Building on the ideas of Schneider and Shiffrin (1977), a principle underpinning attention research is the distinction between automatic and controlled modes of information processing. Automatic processing was defined as being difficult to suppress, having unlimited capacity and needing little attention. Conversely, controlled processing was defined as being open to voluntary alteration, having limited capacity, and demanding attention (Payne & Gawronski, 2010). Concerns over the distorting effects of social desirability on self-report measures (Fazio & Olson, 2003) motivated researchers of cognitive processes to develop new methods of elucidating participants' attention to, and evaluation of, stimuli. The use of sequential priming tasks (Fazio, Jackson, Dunton, & Williams, 1995) aimed to address this by activating participants' attitudes automatically without the ability to exercise strategic control (Wentura & Degner, 2010). In a typical sequential priming task, a prime stimulus is briefly presented to the participant, followed by a target stimulus. Depending on the type of

priming task, the participant is asked to, for example, classify the target as positive or negative (evaluative priming task) or classify the target in terms of a categorical property (semantic priming task). The principle underlying all variants of the task is that the prime stimulus activates associations which, if conceptually congruent with the target, facilitate quick and accurate responses. Conversely, slow and error-prone responses are likely when prime and target are incongruent (Hahn & Gawronski, 2010). Sequential priming was to become an influential approach to indirect measurement in other areas of psychology and a core characteristic of implicit social cognition.

1.4.2. Implicit Memory Research: Unconscious and Conscious Processes

The dichotomy between automatic and controlled processes were complemented by the distinction between unconscious and conscious processes, thanks in part to Greenwald and Banaji's (1995) seminal review which drew on research in implicit memory. Their impetus for developing new attitudinal measures was also driven by an acknowledgement of the shortcomings of traditional self-report measures. Implicit memory is defined by Schacter (1987) as being revealed when the performance on a task is influenced by previous experiences, without said task requiring conscious or intentional recollection of these experiences. It can broadly be thought of as any form of memory that can operate without the person's awareness that they are accessing their memory (Radvansky, 2010). These conceptualisations owe much to the work of researchers such as Meyer and Schvaneveldt (1976), who found that presenting participants with a word (e.g., "butter") facilitated access to conceptually related words (e.g., "bread") which they were quicker to recognise than when the original word was followed by an unrelated word (e.g., "nurse"). Other research using similar paradigms (Schacter, Chiu, & Ochsner, 1993) bolstered the view that memory comprises a network of related entities. The idea that the activation of an entity facilitates activation and retrieval from related entities has been of great significance to the study of implicit social cognition and forms a theoretical basis for the IAT (Greenwald, McGhee, & Schwartz, 1998) and related measures (see 1.5.).

1.4.3. Implicit Social Cognition: A Key Influencer

The development of sequential priming tasks and the IAT in particular led to a surge of further research using these and similar methods (Nosek, Hawkins, & Frazier, 2012). Payne and Gawronski (2010) even point to the challenge for researchers of keeping up with the latest developments in the field, such as the rate of output increased. The influence of the theories and methods of implicit social cognition have not only shaped “virtually every question in social psychology” (Payne & Gawronski, 2010; p.1), but expanded beyond into many applied areas such as health psychology (Wiers et al., 2010) and clinical psychology (Van Bockstaele et al., 2011). As previously noted, its findings have also found their way into public debate, leading to greater outside interest in the area. Much of this popularity can be attributed to the field’s flagship tool, the IAT, which is frequently mentioned in the same breath as implicit bias and has seen more scrutiny and debate than any other implicit measure. The following section will take a closer look at the IAT and use it to highlight some of the prominent trends that have emerged in the study of implicit social cognition over the last two decades and continue to warrant further investigation.

1.5. The Implicit Association Test (IAT)

The IAT, a computerised indirect measure of implicit social cognition, was introduced by Greenwald et al. in 1998. It has become the most commonly used implicit measure in psychology (Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2013) and as of April 2018, the original article had been cited 3579 times in PsycINFO and 9784 times in Google Scholar. The IAT immediately proved an attractive measure for researchers, in part due to its superior psychometric properties compared to its forerunners (Teige-Mocigemba, Klauer, & Sherman, 2010). Sequential priming tasks had been hampered by poor levels of reliability and were thus ill-suited to the assessment of implicit constructs at an individual level (Greenwald & Banaji, 1995). The IAT, in comparison, appeared to demonstrate larger effect sizes and improved reliability at the level of internal consistency (Lane, Banaji, Nosek, & Greenwald, 2007).

In its typical form, the computer-based test requires participants to pair a stimulus representing a category (e.g., gay or straight) with an evaluative

attribute (e.g., good or bad) as quickly as they can. Which category they are required to pair with which type of attribute changes throughout the course of the test. The IAT aims to measure implicit attitudes based on the recorded reaction time (*response latencies*) between conditions.⁵ This difference in reaction time between evaluatively compatible and evaluatively incompatible conditions is known as the *IAT effect* (Govan & Williams, 2004). As such, it employs a similar rationale to evaluative priming tasks and indeed much older measures such as the “Stroop Task” (Stroop, 1935), namely that it will take a participant longer to associate a concept (e.g., insect) to an attribute (e.g., pleasant) where there is a weaker mental association between the two.

1.5.1. Reliability

The enthusiastic adoption of the IAT can be partly attributed to its improved reliability in relation to other available tests in the field. With scores typically between .70 and .90, its internal consistency has proved satisfactory and places it at the top of its class in an across-measure comparison (Gawronski & De Houwer, 2014). Test-retest reliability has however been less laudable, with scores estimated around .50 (Lane et al., 2007). The IAT’s ability to capture temporally stable implicit constructs such as personality traits has been called into question due to this significant variance in scoring (e.g., Oswald, Mitchell, Blanton, Jaccard & Tetlock, 2015). The test’s developers (Greenwald et al., 2015) counter that the problem of limited test-retest reliability is maximal when the IAT is used for individual diagnostic use, but that this is not its intended application. Instead, Greenwald and colleagues (2015) advocate the use of large samples to diagnose system-level biases, thereby diminishing the impact of this attribute.

1.5.1.1. *Trait or State?*

Researchers have offered different theories as to why this discrepancy in reliability is observed, and it continues to be a topic of much debate. A key question has emerged out of this as to whether implicit measures should indeed be interpreted as reflecting stable representations in cognitive networks (*traits*; Fazio, 2007) or rather temporary constructions based on momentarily

⁵ Details regarding the procedure, scoring, etc., will follow in the Methods chapter.

accessible information (*states*; Schwarz, 2007). The variability observed in subsequent retakings of the test has been an impetus for a large body of experiments concerned with systematically manipulating its various parameters to elucidate contributing factors to this phenomenon (Gawronski & Sritharan, 2010). These manipulations can include altering the context in which the targets are presented, for example Roefs et al.'s (2006) findings that high-fat foods are implicitly evaluated more positively when presented in a restaurant context than in the context of a health clinic. A wide range of other contextual manipulations have also produced significant effects, such as Dasgupta and Greenwald's (2001) exposure of participants to counter-stereotype cues before taking the "Race" IAT, resulting in a weakening of implicit associations.

Following the representational trait account, the responses captured by indirect measures depend on how a target object is categorised. Contextual cues are understood as influencing the categorisation of a given object, thereby influencing which category representation is activated in response to the object, and ultimately influencing the measured response (Hahn & Gawronski, 2018). A constructivist state account on the other hand conceptualises IAT responses as being dependent on momentarily accessible attributes rather than abstract representations of a category. Gawronski, Ye, Rydell, and De Houwer (2014) argue that either account can explain the observed effects, but that these have typically been applied post-hoc, without providing testable predictions about their boundary conditions. As such, further empirically supported theories are required to understand the relationship between the observed retest variance and construct variance.

1.5.1.2. Occasion-related Processing Differences

Investigating the potential impact of construct-unrelated variance is a second promising avenue for researchers wishing to explain the discrepancy in reliability (Teige-Mocigemba et al., 2010). This is due to the possibility that the two occasions of measurement exert not as yet understood influences on the process underpinning the IAT, rather than the on the measured constructs themselves. Among the factors hypothesised to influence task performance are the level of attentional focus during the test (Gawronski & De Houwer, 2014),

learning effects, and conscious strategies (Teige-Mocigemba et al., 2010). Sherman et al. (2008) add that the above distinctions need not be seen as mutually exclusive: Pending further experimental evidence, the test-retest variance may reflect that the IAT measures states as well as traits, and that scores can additionally be influenced by elements of change in the test-taking process.

1.5.2. Construct Validity

Construct validation is a cumulative process of evidence-gathering by which conceptual and empirical justification for a construct can be gained (Nosek et al., 2012). Some of the approaches used to identify the implicit constructs the IAT aims to capture are explored below.

1.5.2.1. *Group-level Validation Approaches*

A priori assumptions have served as a starting point for experimentally assessing the validity of the IAT. In their first published demonstration of the IAT effect, Greenwald et al. (1998) chose the target categories of insects and flowers, as the latter has consistently been reported to be preferred to the former by a large part of the population.⁶ It was hypothesised that this preference would be reflected in the IAT results, which indeed it was. When applying the IAT to a domain in which preferences are not expected to be universal (e.g., smoking, sexuality) researchers have used a *known-group approach* to validation (Teige-Mocigemba et al., 2010). This adopts the a priori assumption that certain groups will hold different preferences which will be borne out by the IAT results.

In some domains, such as attitudes toward sexuality (gay—straight; Banse, Seise, & Zerbes, 2001) and “racial” attitudes (Black—White; Nosek, Banaji, & Greenwald, 2002), discriminant IAT validity was demonstrated in line with the researchers’ predictions that groups would differ in their performance: In Banse et al.’s study of 101 participants (distributed evenly between gay men, lesbian women, straight men, and straight women), gay and lesbian sexuality were significant predictors of preference for the “homosexuality” category. Similarly,

⁶ Social desirability was not considered a likely mediator in this instance.

Nosek et al.'s (2002) analysis of the scores of 160,000 participants who had taken the "Race" IAT online showed that while both White and Black participants showed a preference for White faces, the strength of this preference was considerably weaker amongst Black participants overall.

Other domains, particularly those more related to health behaviours, have however failed to consistently differentiate between groups. An example of this is Swanson, Rudman & Greenwald's (2001) comparison of implicit attitudes towards smoking between smokers ($n=38$) and non-smokers ($n=46$). IAT results did not show any significant difference between groups despite a marked difference in explicit attitudes towards smoking. The authors hypothesise that this may suggest the difficulties of bolstering stigmatised behaviour on an implicit level, however not enough is known about the processes involved to account for the results.

1.5.2.2. Relationship with Explicit Measures

Validating implicit and explicit social cognitions necessitates evidence for both divergent and convergent validity, as one wants to assess that they are not measuring the same thing (divergent), yet that they are distinctly related constructs (convergent; Nosek & Greenwald, 2009). Nosek's (2007) analysis of IAT results and corresponding explicit measures from 56 domains ($n=175$ -290 for each) yielded a moderate correlation of .48, varying widely from weakly positive ($<.20$, e.g., Asians—Whites) to strongly positive ($>.75$, e.g., pro-choice—pro-life).

These results lend credence to the notion that self-presentation (influenced by social norms) is a moderating factor in the relationship between the measures. Overall, domains in which participants could expect to suffer greater social sanctions by expressing negative attitudes towards a group (e.g., ethnicity) tend to see weaker correlations than those in which they are less likely to (e.g., political preference). However, these patterns needn't imply deliberate alteration of responses, but can plausibly point to the introspective limits of participants whose automatic responses do not fit with their sense of self (Nosek, 2007).

Although self-presentation does appear to moderate the relationship between implicit and explicit bias, Hahn and Gawronski (2018) caution that it only accounts for part of the difference seen. Nosek et al. (2012) add that attitudes that are important to the individual and are thought about often tend to elicit stronger implicit-explicit correlations than ones that are infrequently thought about. Payne, Burkley, and Stokes (2008) highlight the caveat that the type of direct (explicit) measure used to compare with the IAT has the highest correlational impact, and the more similar the task demands, the higher the correlation between the measures. Therefore, the observed relationships between the IAT and direct measures are at least as likely to reflect the structural fit of the measures as their underlying attitudinal constructs.

1.5.2.3. Predictive Validity

Of major interest in the study of implicit social cognitions is how they map on to real-world behaviour. The most recent and widely debated meta-analyses on this subject involving the IAT come from Greenwald, Poehlman, Uhlmann, and Banaji (2009) and Oswald et al. (2013). Greenwald et al. (2009) reviewed 122 research reports comprising almost 15,000 subjects, encompassing a variety of domains from intergroup attitudes to political and consumer preference. The authors found an average of $r = .274$ for prediction of behaviour measures by IAT measures. Corresponding direct measures averaged $r = .361$, higher than their implicit counterparts. However, the variability of effect size among self-report measures was much higher than that of the IAT and was strongly associated with the domain of assessment. In socially sensitive domains (e.g., samples with criterion measures involving Black—White behaviour), the IAT outperformed direct measures in prediction of behaviour, whereas in areas such as political and consumer preference, direct measures proved a superior predictor of behaviour.

Oswald et al. (2013) conducted a meta-analysis focusing solely on studies that had measured levels of ethnic and “racial” discrimination in conjunction with administering the relevant IAT (stereotype or attitude) and direct measures of bias. They concluded, unlike the previous researchers, that the IAT’s predictive value was no better than that of direct measures, averaging $r = .148$.

Greenwald, Nosek, and Banaji (2015) responded to these claims, pointing to the use of different inclusion criteria as an explanation for the discrepant conclusions. Regardless of this inclusion policy, they argued, both meta-analyses estimated large enough aggregate correlational effect sizes to explain discriminatory impact on a societal level. Both groups of authors concluded that in its current form, the IAT was unsuited as an individual diagnostic tool.

Based on theoretical developments, other researchers (e.g., Perugini, Richetin, & Zogmeister, 2010) have appealed for a more nuanced approach when considering the nature of the behaviour being measured in the analysed studies. Similar to the way that direct and indirect measures differ in their predictive merits depending on the domain in question (Greenwald et al., 2009), stronger and weaker measure-type associations can be found depending on whether the measured behaviour is spontaneous or deliberate (Hahn & Gawronski, 2010). *Dual-process models* of implicit social cognition conceptualise direct and indirect measures as representing different underlying processes (e.g., Fazio, 2007). This model holds good explanatory power for findings which demonstrate stronger associations with IAT scores and spontaneous/unplanned (e.g., nonverbal) behaviour and stronger associations between explicitly stated bias and deliberate (e.g., verbal) behaviour (Dovidio, Kawakami & Gaertner, 2002).

Although evidence for the described dissociative pattern between direct/indirect measure and deliberate/spontaneous behaviour exists, several studies do not demonstrate these patterns (Perugini et al., 2010). For instance, direct and indirect measures have been found to have an additive pattern, for example increasing the prediction of consumer choice when taken together rather than separately (Maison, Greenwald, & Bruin, 2004). Hahn and Gawronski (2018) point to the future challenges of identifying the boundary conditions between the identified predictive patterns as well as developing theories for why they occur in particular conditions.

Another valuable contribution to the question of what predicts behaviour regards the role of working memory and self-regulation (Hofmann, Gschwendner, Wiers,

& Schmitt, 2008). In studies of sexual interest behaviour and the consumption of tempting food, participant's implicit attitudes toward the temptation had a stronger influence on their actions if they scored lower in assessments of working memory capacity. Conversely, the behaviour of individuals who had higher working memory scores was predicted more accurately by self-report measures. Together, these findings suggest that caution should be exercised when grouping behaviours and participants together to conduct large-scale analyses, as they may be reflecting different constructs and attitude-unrelated individual differences.

1.5.3. Confounding Factors

As a comprehensive process model which can take account of the various elements of the IAT effect has not been forthcoming, the relative impact of construct-related and construct-unrelated influences cannot be controlled for statistically (Teige-Mocigemba et al., 2010). Whereas some factors (e.g., order in which conditions are presented) are inherent to the structural design of the test itself, others, such as cognitive ability (see below), differ between individuals and will exert different levels of influence. Furthermore, elements of the test such as stimuli used may be presented in the same manner yet hold different construct-unrelated associations for participants, complicating attempts to capture the construct of interest. Some of the factors that have been shown to contaminate the IAT effect are outlined below.

1.5.3.1. *Cognitive Abilities*

In addition to the predictive effects of working memory on behaviour, the relationship between cognitive ability and task performance warrant consideration. As overall response speed is associated with cognitive abilities, correlations found between response speed and the size of IAT effects suggest these differences in effect size are at least in part determined by participants' cognitive skill (Cai, Sriram, Greenwald, & McFarland, 2004). Cognitive processing speed generally declines with age, and given that larger IAT effects are seen with older individuals, there is a compelling case that cognitive differences explain some of the observed differences in effect size between ages (Sherman et al., 2008).

Further suggestions of a cognitive ability confound come from studies showing correlations between different IATs which aim to capture unrelated constructs and thus should not be intercorrelated (Teige-Mocigemba et al., 2010).

Taken together, these findings indicate that some of the variance observed in IAT effects is attributable to factors that affect different IATs similarly. Cognitive ability, as a known confound in other psychological assessment (Meyer et al., 2001) is a likely contender. Different techniques to reduce the cognitive skill confound have been proposed (see Teige-Mocigemba et al., 2010), including the adoption of an adapted scoring method less vulnerable to such factors (see Methods; Greenwald, Nosek, & Banaji, 2003).

1.5.3.2. Stimuli

A number of studies have demonstrated that IAT effects are not only determined by participants' attitudes towards categories (e.g., Black—White; Nosek et al., 2002) but also by the stimuli used to represent these categories (e.g., a particular Black or White face). Mitchell, Nosek, & Banaji (2003), for example, found that IAT effects could be manipulated in a sample of US students ($n=91$) by selecting stimuli which confound the category distinction of interest with another category distinction. By using popular Black athletes and “disliked” White politicians as stimuli to represent the different “race” categories, the measured implicit bias weakened towards a neutral preference. It should however be noted that the observed difference in IAT effect may be attributable in part to other confounding variables known to contribute to bias, such as age, weight and attractiveness. Govan and Williams (2004) further demonstrated the importance of stimuli use by adapting the words and images used in the original Flower—Insect IAT, substituting, e.g., “poison ivy” for “rose” and “ladybird” for “wasp”. Eighty Australian undergraduate students showed a reversed IAT effect, suggesting a preference for insects, with this alternative version. These studies illustrate how incautious selection of stimuli can inadvertently affect results.

De Houwer et al. (2009) point to the challenge of knowing which stimuli are most suitable for measuring which particular category or attitude, as the potential confounds may not appear obvious. However, researchers have

identified a number of areas that warrant consideration when attending to the stimuli of an IAT. They include the above caveat to avoid unbalanced valency of stimuli (positive or negative) between categories (Govan & Williams, 2004). Care should also be given to ensure as best possible that the stimuli cannot be misconstrued or regrouped under a different category (Teige-Mocigemba et al., 2010). Based on their findings, Steffens, Kirschbaum, and Glados (2008) suggest including the categories themselves as word stimuli to avoid confounds resulting from ambiguity and mis-categorisation. Familiarity with the stimulus is a further important variable. Ottaway, Hayden, and Oakes (2001) demonstrated how the inclusion of low-familiarity words in the insect-flower and “Race” IAT had a significant impact on the IAT’s sensitivity. This consideration also applies to the familiarity of picture stimuli, which due to their previous associations may be evaluated differently, thus impacting the measure (Fiedler, Messner, & Bluemke, 2006).

1.5.3.3. ‘*Extrapersonal Associations*’

A further issue raised when interpreting the IAT effect is to what extent it might reflect culturally shared assumptions rather than those held by the individual. *Extrapersonal associations* are defined by Olson and Fazio (2004) as “associations that do not contribute to one’s evaluation of an attitude object” (p. 653). Evidence in support of this potential confound firstly comes from studies in which groups with diverging personal and societal views took the IAT (Olson & Fazio, 2004), with subsequent IAT effects sometimes being in line with the societal view rather than the personal. Furthermore, De Houwer et al. (2009) note how the IAT’s poor predictive validity of health-related behaviour can be argued to reflect a societal preference for health-related concepts which may not hold true at the individual level.

Hahn and Gawronski (2018) argue that this issue can only be properly addressed by considering its philosophical implications alongside empirical findings. Differing concepts of the ‘true self’ can be found at least as far back as Platonic and Aristotelian philosophy. According to one, the self is conceptualised as being driven by impulses which must be controlled for virtuous behaviour to prevail, while according to the other, the ‘true self’ is

conceptualised as the rational moderator who keeps impulsive and uncivil passions in check (Payne & Gawronski, 2010). To meaningfully explore this question therefore necessitates clarification of what the ‘true self’, which the indirect measure aims to capture, should actually represent. Hahn and Gawronski (2018) assert that this aspect cannot be answered by empirical means. Indeed, researchers in the area (e.g., Nosek et al., 2012) have increasingly raised doubts over the conceptual distinction between personal and extrapersonal IAT effects, given the wealth of literature that demonstrates the extent to which individuals’ associations are shaped by their environment (e.g., Olson & Fazio, 2006). This should be distinguished from the debate around the predictive validity of implicit biases (see above) and how much these can be moderated by explicit concerns in situations that allow conscious deliberation.

1.5.4. Public Perception of the IAT

In line with much of the academic community, the IAT was rapturously embraced by the public as its profile rose in the 2000s. The test was often cited as the main source of evidence for the phenomenon of implicit bias, with its developers making appearances in the media to discuss the process and implications of the IAT. This culminated in the publication of “*Blindspot: Hidden biases of good people*” (Banaji & Greenwald, 2013), a book for lay audiences on the insights gained from the IAT toward our understanding of implicit bias. More recently, the debates around the IAT’s properties (especially test-retest reliability and predictive validity; Oswald et al., 2013) have spilled over into the public arena, leading to more critical media coverage (e.g., Singal, 2017; Lopez, 2017). Amidst the conflicting messages presented to the public about how best to interpret one’s individual score on the IAT, researchers have begun taking an interest in participants’ attitudes towards the test itself (e.g., Howell & Ratliff, 2017; Yen, Durrheim, & Tafarodi, 2018), suggesting a range of responses from defensiveness to acceptance and ownership of the results.

1.5.5. Summary

The IAT has become an incredibly influential tool within the last two decades. The multitude of studies that have adopted its methods have revealed patterns that suggest our cognitions are not always as we perceive them or would wish

them to be. The outstanding questions that remain and continue to divide opinion attest to the complex nature of human thought and behaviour. As the continuing research into contextual factors as well as individual differences suggests, the IAT effect should not be seen solely as the static characteristic of an individual, nor as a pure reflection of a situation. Rather it is a “reflection of the person within a given situation” (Gawronski & Bodenhausen, 2017; p.271), which can help explain discriminatory impacts on a population level (Greenwald et al., 2015).

1.6. Implicit Bias Amongst Healthcare Professionals

Even when controlling for factors such as socioeconomic status, educational attainment, and underlying health conditions, there is evidence that healthcare professionals (HCPs) do not provide an equivalent level of care to patients belonging to different social groups (Clarke, 2009; Byrne & Tanesini, 2015). Attributing part of this disparity to the actions of HCPs may not seem immediately intuitive, as many report to espouse explicitly egalitarian goals (e.g., Chapman, Kaatz, & Carnes, 2013; Drewniak, Krones, & Wild, 2017). However, an increasing body of research has explored whether HCPs’ implicitly held biases could be contributing to the observed inequalities.

As with the initial application of the IAT and focus of public discourse, much of the US literature on implicit bias in healthcare has centred on the issue of “racial” attitudes and stereotypes of healthcare providers and patients. Studies demonstrating different clinical decisions made when dealing with Black and White patients make this a pertinent issue. Examples include Gerber et al.’s (2013) retrospective cohort study of 222 paediatricians and over 200,000 (child) patients, finding that Black children are significantly less likely to be prescribed antibiotics for respiratory infections than White children. Furthermore, Hoffman, Trawalter, Axt, and Oliver (2014) investigated whether beliefs about “race-based” biological differences were implicated in the observed disparities between Black and White patients’ pain management. A sample of 222 White medical students were asked whether they believed various false statements regarding Black and White people, such as “black people’s skin is thicker than

white people's skin".⁷ In subsequent ratings of pain perception and treatment recommendations across different scenarios, endorsement of false statements was correlated with lower ratings of Black pain severity and less accurate treatment recommendations. These findings suggest that cultural beliefs and stereotypes may be a contributing factor to the fact that Black patients are less likely to be prescribed pain medication and at lower doses than White patients. As only White medical professionals were investigated, further research on the interactions of White and Black patients' beliefs and outcomes could prove illuminating.

Maina, Belton, Ginzberg, Singh, and Johnson (2017) conducted a review of 37 studies to date which had used "race"-based IATs amongst healthcare professionals. Of these, 31 showed HCPs to have a pro-White (light skin) implicit bias. Correlations between IAT results and clinical outcomes were mixed; however all seven studies examining the impact of implicit provider bias on real-world patient-provider interaction found that stronger implicit bias correlated with poorer patient-provider communication.

Studies on HCPs' implicit associations towards other groups are much fewer and when done have not typically compared biases to associated outcomes. Other areas of inquiry have included implicit attitudes towards gay and lesbian people, exemplified by Burke et al.'s (2015) study of over 2000 medical students, showing 81.5% exhibited an implicit preference for straight people. Weight bias has also been studied amongst dieticians (Edelstein, Silva, & Mancini, 2009), finding they exhibited a stronger pro-thin bias than the general population. Despite a number of UK-based studies also investigating the role HCP attitudes might play in the care of minority ethnic patients (Williams & Mohammed, 2009), lesbian, gay and bisexual patients (Hunt & Minsky, 2005), overweight patients (Swift, Hanlon, El-Redy, Puhl & Glazebrook, 2013) and older patients (Clarke, 2009), the study of these domains has not seen the use of implicit measures such as the IAT. Therefore, insights in these areas must be

⁷ Statements such as these were not uncommon in the scientific literature into the 20th century (Basset, 2015).

inferred predominantly from studies of US healthcare, despite its structural and demographic differences.

1.6.1. Implicit Bias amongst Psychologists

In a review of the literature, Blencowe (2017) summarised the research on implicit bias amongst applied psychologists. The number of studies totalled seven, which, with the addition of Blencowe's own contribution, remains the same as of April 2018. All of these prior studies had been conducted in the US and used the "Race" IAT, with occasional inclusions of the Sexuality IAT (Boysen & Vogel, 2008) and the Weight IAT (Jackson, 2015). Taken together, their findings suggest that applied psychologists (a heterogeneous group of trainee and qualified clinical and counselling psychologists, as well as other therapists) are implicitly biased against African American people, regardless of the indirect measure used. Sexuality and weight biases also exist, but would require replication on a larger scale. These studies do not allow confident conclusions to be drawn regarding explicit attitudes and their relationship to measured implicit bias, due to the idiosyncratic measures used in them.

Blencowe's (2017) study looking at the biases of trainee and qualified clinical psychologists thus represents the first study in the area conducted in the UK to investigate a specific profession with validated indirect (IAT) and direct (*semantic differential*) measures. A moderately sized sample of Clinical Psychologists ($n=81$), Trainee Clinical Psychologists ($n=138$) and members of the general UK population ($n=86$) completed between one and five IATs and corresponding self-report measures. These were in the areas of weight, skin-tone, age, sexuality and gender-career. The results suggested that similar implicit biases are found in the clinical psychology profession as in the general population. Explicit biases towards non-dominant groups were neutral or positive except towards weight, and implicit pro-thin biases were similar across groups. This study identified some limitations in terms of its generalisability due to limited diversity amongst participants. Potential stimulus confounds were also noted, with an acknowledgement that these stimuli and items would benefit from updating.

1.7. Bias Experienced by Transgender People

1.7.1. General Population

Trans people represent a significant and growing minority in the UK population, estimated at approximately 300,000 (Reed, Rhodes, Schofield, & Wylie, 2009). Despite an extensive psychological literature on the effects of prejudice towards those identifying or identified as gay and bisexual, in much of the research the trans population has tended to be subsumed under the umbrella term LGBT⁸ (e.g., Meyer, 2015). Though often including trans people in their analyses, trans-specific issues have until recently rarely been a focus of these studies, despite arguably being distinct from many of the issues faced by lesbian, gay and bisexual people (Ellis, Bailey, & McNeil, 2016).

Ellis et al. (2016) surveyed 660 people identifying as trans living in the UK to help ascertain the current prevalence and nature of transphobia (characterised by negative prejudice and hostility experienced by trans people) in the country. Most respondents reported having experienced open hostility from members of the public. Social hostility, which included being made fun of or called names for being trans, was experienced by the overwhelming majority, on more than one occasion. Physical and sexual abuse suffered due to their identity were reported by approximately one in five. Although the study probes potential areas of discrimination comprehensively, it is possible that its length (89 pages, 1-2 hours) may have prevented some from participating. Importantly, participants were largely recruited through trans support groups, which may not reflect overall trans experiences.

The British Social Attitude survey (NatCen, 2017) added questions about transgender people for the first time in 2017, a further indication of the increasing visibility of this group. While 84% of respondents described themselves as “not prejudiced at all”, less than half agreed that a suitably qualified trans person should definitely be employed as a police officer or

⁸ Although recent years have seen a broadening of identities included in this group, e.g., LGBTQQIAP (Erby et al., 2016).

primary school teacher. This suggests that there is a significant gap between the “theory” and “practice” of people’s attitudes.

1.7.2. Healthcare Professionals

Studies of attitudes towards trans people have explored the link between their experiences of victimisation and health outcomes. Boza and Nicholson Perry (2014) examined the health outcomes of 243 transgender Australians via an online survey, which revealed a very high prevalence of depressive symptoms (59%) and attempted suicide (44%), with 69% reporting at least one instance of victimisation. Bariola et al. (2015) incorporated these data in their analysis of trans Australians’ mental health outcomes, concluding that experience of victimisation was a predictor of poorer outcomes. The magnitude of the mental health difficulties faced by trans people elicits concern, and the above studies are consistent with initial findings on trans peoples’ mental distress in the UK, such as Davey, Bouman, Arcelus, and Meyer (2014), who analysed questionnaires completed by patients ($n=103$) attending a gender identity clinic. It bears considering that the above studies were reliant on a self-selecting sample and as such might not fully reflect the experiences of trans people. Furthermore, other factors such as substance use or health status (e.g., HIV) which are known predictors of mental health outcome were not collected.

Considering the identified impact of social behaviour on trans people’s health, it would seem important to ensure HCPs do not compound these difficulties by their interactions with trans people. Beginning in 2013, the Twitter hashtag “#transdocfail” gained prominence across the social media platform, being used by trans people to share their accounts of how their healthcare had been negatively impacted by HCPs due to their trans status (Belcher, 2014). Other examples of the population’s difficult relationship with HCPs include “trans broken arm syndrome” (Dietz & Halem, 2016), a coin termed to refer to the *diagnostic overshadowing* experienced by trans people when an unrelated health concern (e.g., a broken arm) leads to an unwarranted focus on their gender identity. A lack of LGBT+-related education amongst many medical and allied health professional training courses has been suggested as a maintaining factor (Parameshwaran, Cockbain, Hillyard, & Price, 2017).

The development and use of validated direct measures of trans-related attitudes (e.g., the Attitudes Toward Transgendered Individuals Scale [ATTIS]; Walch, Ngamake, Francisco, Stitt, & Shingler, 2012; the Transgender Attitudes and Beliefs Scale [TABS]; Kanamori, Cornelius-White, Pegors, Daniel & Hulgus; 2017) is a nascent area of research which has only recently been applied to HCPs. Initial findings include Fisher et al.'s (2017) Italian study comparing 53 HCPs with members of the general population. In a survey of attitudes towards transgender people, HCPs generally reported more favourable attitudes, however male gender and "religious fundamentalism" were predictors of anti-trans attitudes, also amongst HCPs. The authors speculated on the generalisability of the results due to a potentially unique religious, heteronormative, family-based culture. Ali, Fleisher, and Erickson's (2016) comparison of 142 Canadian HCPs with undergraduate student norms also suggested that HCPs generally self-report more favourable attitudes towards trans people. As with other self-report studies, it cannot be ascertained to what extent social desirability may have influenced these results.

Brown, Kucharska, and Marczak (2017) conducted a systematic review of the literature on mental health practitioners' attitudes towards transgender people. They identified 13 studies which had used a variety of direct attitudinal measures, the majority of which were conducted in in US, with four in Australia and one in Canada. The results of these broadly echo the findings of other HCP-trans attitude studies in that practitioners' attitudes scored more positively overall than control populations. However, a consistent finding has been that males (HCPs and general population) hold more negative views, making gender a greater predictor of attitude than profession. This pattern sits alongside Kanamori and Cornelius-White's (2017) review of counsellors' and counselling students' attitudes towards trans people, in which the additional factors of familiarity with individuals who are transgender, low extent of homophobia, and low religiosity were associated with more positive attitudes. It should be noted that these studies used small to moderate convenience samples, and that HCPs overwhelmingly identified as heterosexual and cisgender, not allowing for an analysis of the influence of HCP sexuality or gender identity.

1.8. Psychologists' Implicit Bias towards Trans People

As the reviewed literature indicates, there can often be discrepancies between HCPs' self-reported levels of bias and those suggested by indirect measures. At a time when trans-related issues are increasingly part of the public discourse, there is a clear rationale for measuring implicit attitudes towards this group of people. Brown et al. (2017) highlight that this omission in the study of transgender attitude does not allow a full appreciation of other facets of bias that might be affecting trans peoples' experiences. Drawing on the findings of studies on psychologists' implicit bias and those concerned with the biases that trans people face, a strong case can be made for expanding the research by synthesising these areas of inquiry.

Firstly, associations between measured levels of HCP implicit bias and outcomes have consistently shown communication to be one of the main factors affected (Maina et al., 2017). Zestcott, Blair, and Stone (2016) propose that it is this impact on patients' perception, trust and judgement of the HCP which may account for a larger proportion of observed disparities than, for instance, differences in prescription, as these factors are known to influence engagement and adherence to treatment. The communication between therapist and client is a core skill of the psychological practitioner, with the quality of the therapeutic relationship strongly linked to therapeutic outcome (Sperry, Carlson, & Kjos, 2003). Therefore, the potential implications of implicit bias on behalf of the therapist are of significant relevance to psychological practice.

Secondly, similarly to other minorities and marginalised groups, transgender people experience numerous instances of interpersonal and systemic bias directed against them. These range from blatant hostility to subtler forms of "microaggression" (Nadal, Skolnik & Wong, 2012). Nadal et al. (2012) argue that this experience of pervasive discrimination itself puts trans people at greater risk of mental distress in line with the *minority stress model* (Meyer, 2003). In a study into trans people's experiences of seeking and receiving psychotherapy in the UK, Hunt (2014) recorded that it was elements such as trust, not feeling judged, and therapist's cultural awareness that were

associated with a positive experience of therapy. These qualities map well onto those identified as correlating with lower levels of bias in studies comparing HCP implicit “racial” bias and patient self-reports. Thus, the apparent link between implicit bias and factors intrinsic to the therapeutic relationship point to the potential value of developing tools to measure implicit bias towards transgender people.

1.8.1. Search Strategy

The above considerations suggested a search of the literature focusing on implicit bias towards trans people, as this group’s absence was noted in the preceding review of studies on implicit bias. No specific exclusion criteria were applied, so as to increase the likelihood of locating relevant contributions in what was predicted to be an area of limited research. Thus, non-peer-reviewed contributions such as doctoral theses and dissertations were also included in the search to inform the understanding of the area. Relevant databases and search terms were identified based on the literature and consultation with the university’s psychology librarian. Databases searched were: Academic Search Complete, CINAHL Plus, PsycINFO, PubMed, ScienceDirect and SCOPUS. The variety of word options used (e.g., implicit/unconscious/indirect) reflects the variety of terminology in the field. Depending on the search options available, terms were searched within “title, abstract, and keywords” or “all fields”. All searches were conducted for articles published on or before 16th April 2018. The search strategy can be taken from Table 1 below.

Table 1: Literature Search – Terms and Databases

Database	Search Terms	No. Results Found (16/04/2018)
Academic Search Complete (1887-present)	ALL TEXT: ("implicit" OR "unconscious" OR "automatic" OR "indirect") AND ("bias" OR "attitude" OR "prejudice")	84
CINAHL Plus (1982-present)	AND ("transgender" OR "trans" OR "transsexual" OR "transman" OR "transmen" OR "transwoman" OR "transwomen")	
PsychINFO (1880-present)		
Provider: EBSCO		
Pubmed (1809-present)	ALL FIELDS: ("implicit" OR "unconscious" OR "automatic" OR "indirect") AND ("bias" OR "attitude" OR "prejudice") AND ("transgender" OR "trans" OR "transsexual" OR "transman" OR "transmen" OR "transwoman" OR "transwomen")	74
Science Direct	TITLE, ABSTRACT, KEYWORDS: ("implicit" OR "unconscious" OR "automatic" OR "indirect") AND ("bias" OR "attitude" OR "prejudice") AND ("transgender" OR "trans" OR "transsexual" OR "transman" OR "transmen" OR "transwoman" OR "transwomen")	12
Scopus (1960-present)	TITLE, ABSTRACT, KEYWORDS: ("implicit" OR "unconscious" OR "automatic" OR "indirect") AND ("bias" OR "attitude" OR "prejudice") AND ("transgender" OR "trans" OR "transsexual" OR "transman" OR "transmen" OR "transwoman" OR "transwomen")	93

A total of 263 articles were identified from the literature search. Titles and abstracts were scanned, with eight papers requiring further reading of their full-text versions to determine eligibility. A Google Scholar search with related words revealed two additional unpublished studies involving the development of a Gender Identity/Transgender IAT (Prunas, Bini, & Hartmann, 2015; Conway, Axt, & Westgate, 2018). The authors of the former were contacted and provided an abstract from a podium session on the study. Permission to cite Conway et al. was obtained, and their data was made available via the *Open Science Framework*.

Six studies concerned with measures of implicit bias and transgender were ultimately identified, which comprised four research studies and two dissertations. Two of the studies had been published in academic journals while another could only be evaluated based on its abstract (see above). The fourth study (Conway et al., 2018) was still in the process of data collection and has not been subjected to peer review. Of the two doctoral dissertations, one (Wang-Jones, 2016) had been written up and published as the two aforementioned articles, and as such is not considered separately in the review. The collated research is summarised in chronological order below.

1.8.2. Narrative Summary

Prunas et al. (2015) developed two versions of a “Gender Identity IAT” using words and pictures for target stimuli respectively. The aim of the study was to ascertain transgender people’s implicit associations with male and female genders and investigate the convergence with direct measures of gender identity, gender dysphoria and sex roles. Conducted in Italy, 40 participants with a diagnosis of gender dysphoria (20 female-to-male, 20 male-to-female) were compared with cisgender straight and gay controls. The results showed no difference on performance between trans- and cisgender groups within gender. Hence, despite not measuring attitudes towards trans people, this study’s findings suggest that gender identification is independent of biological sex and sexual orientation on direct and indirect measures. Though requiring replication, this study is notable for its comparison of transgender participants with other groups, which has not been possible in previous studies due to the

demographic option of transgender not being included. It represents the first (known) use of indirect measures in transgender research.

Gleason's (2016) dissertation involved the creation of a measure of "implicit transphobia", which was compared with relevant self-report measures among a sample of 57 US HCPs spanning a range of professions including clinical psychology, social work and psychiatry. The implicit transphobia measure was an affective priming task (Fazio, 2007; see 1.4.1.), in which the affective responses following transgender- and cisgender-related primes were measured in order to capture the implicit valence assigned to each set of stimuli. The study used primes of transgender-related, cisgender-related and neutral images which were paired with positive or negative target images. Participants were asked to rate target images as positive, negative, or neutral. The transgender stimuli consisted of two photos next to each other, showing an individual before and after they had transitioned. The cisgender stimuli also showed an individual in both photos, differentiated by elements such as their clothing and position (but not their gender). The differences found between HCPs' measured levels of explicit transphobia were not reflected in the indirect measure. Implicit transphobia was also not correlated with HCPs' treatment decisions based on clinical vignettes. Furthermore, the indirect measure was not related to HCP knowledge of transgender issues. As outlined in the study's discussion, there are a variety of possible reasons this measure did not capture the intended construct. Apart from the small sample size, the trans- and cisgender primes were complex and might not have allowed for proper processing within a short amount of time (De Houwer et al., 2009).

Wang-Jones was the lead author on two studies: the first of these (Wang-Jones, Alhassoon, Hatrup, Ferdman, & Lowman, 2017) was concerned with the development of an IAT to assess attitudes toward transmen and transwomen, and the second (Wang-Jones, Hauson, Ferdman, Hatrup, & Lowman, 2018) used this measure to compare implicit and explicit attitudes of gay, straight, and *non-monosexual* (e.g., asexual, bisexual, pansexual) participants. Separate IATs were created for attitudes towards transmen and transwomen respectively. Its validation process involved 344 US participants, including 43 transgender

individuals. The developed IATs comprised words synonymous with the transmen or transwomen label, using variants of “transsexual” and “men” or “women” paired together, contrasted with variants of “biological men” and “biological women”. Both measures correlated with scores on a direct measure (feeling thermometer) of attitude, with explicit, but not implicit, attitudes correlating with social desirability. Wang-Jones et al. (2018) tested these new measures further, studying the performances of 265 cisgender participants identifying as straight, gay, or non-monosexual. An interaction was found between measurement type (direct/indirect) and sexuality, with gay participants reporting more positive attitudes towards trans people than straight participants, yet displaying similar implicit biases against transmen and -women.

Most recently, Conway, Axt, and Westgate (2018; unpublished) have developed and begun validating a different Transgender IAT. This IAT combines attitudes towards transwomen and -men into one target category, with a corresponding male and female cisgender category. Faces of trans and cis celebrities are used as picture stimuli which must be paired along with positive and negative words. They recruited a large sample of 996 US-Americans (male and female, sexuality and transgender status not recorded) in a pilot study testing the measure’s validity. Performance on the IAT was compared to two self-report measures, assessing gender role beliefs and transphobia. Results showed less favourable implicit bias towards transgender celebrities to be predictors of greater gender role beliefs and greater self-reported transphobia. This measure shows promise, however the use of celebrity images does allow for potential confounds. These include varying levels of participants’ familiarity and greater association with, for example, a fictional character (in the case of actors) than the category they represent. Perceived attractiveness is a further possible contaminating factor.

The recency of these studies demonstrates that this a rapidly developing area of research. Of the three measures developed to elucidate implicit transgender bias, the two versions of the IAT (Wang-Jones et al., 2017; Conway et al., 2018) show the most promising qualities and warrant further research. An important consideration is that these studies were conducted in the US and as such may

not be as well suited to UK participants. Wang-Jones et al.'s (2017) measure, for example, uses the term "transsexual" which is now considered outdated in UK usage (GIRE, 2015). Target stimuli such as "transsexual gals" can therefore be deemed culturally inappropriate to the UK. Conway et al.'s celebrity stimuli also pose potential problems as they were selected according to similar levels of popularity amongst US audiences, which will likely differ in the UK (although regardless of country this would be liable to change with time). Due to interactions found between sexuality, transgender status, and IAT effects (Wang-Jones, 2018), including these aspects in the collected demographics recommends itself.

1.9. Study Rationale and Aims

This study aims to build on previous research on implicit biases exhibited by UK clinical psychologists (Blencowe, 2017). In its Code of Ethics and Conduct, The British Psychological Society (BPS, 2018) advises its members to be "aware of the importance of both context and character affecting our behaviour" (p.3), and for psychologists "to be mindful of their strengths and weaknesses in order that they are able to behave in the most ethical way possible." (p.3). It goes on to emphasise respectful and unbiased treatment of "all human beings, regardless of perceived or real differences in social status, ethnic origin, gender, [...] or any other such group-based characteristics." (p.5). As implicit biases have been linked with behavioural differences towards others, it is in keeping with these guidelines that they are brought to practitioners' awareness. It is also imperative that the potential consequences of bias are considered beyond the therapy room. Clinical Psychologists are increasingly expected to take on more leadership roles which involve interprofessional work with colleagues, teams and services (Division of Clinical Psychology [DCP], 2010). Furthermore, the possibility of even subtle changes in judgement and behaviour stemming from implicit processes (e.g., in recruitment) may be inadvertently counteracting the profession's efforts to increase inclusivity and diversity within its own ranks (DCP, 2015).

The US-based literature has mainly focused on the intergroup associations between African Americans and European Americans which are culturally

bound, and thus have been identified as limited in their generalisability. Nonetheless, the repeated finding of less favourable implicit bias being associated with poorer quality relationships between HCPs and service users suggests particular relevance for the psychological professions. The continued disparities observed in certain populations also point to the value of clarifying whether implicit processes may play a maintaining role. This study seeks to update the IAT in a way that is culturally and temporally relevant to the UK and pertinent to clinical psychology. These ambitions aim to be achieved by:

- Developing new stimuli for the previously used Skin-tone, Age, Weight and Sexuality IATs to address identified confounds
- Developing a new Gender Identity IAT
- Comparing a sample of Trainee Clinical Psychologists' performance on the revised and new tests against gathered general population norms
- Exploring whether implicit biases are predicted by demographic factors such as age, gender, sexuality and ethnicity

2. METHODS

2.1. Epistemological Position

Epistemology is a branch of philosophy concerned with the possibilities of human knowledge (Hofer, & Pintrich, 1997). For much of the history of empirical science, the prevailing view has been that the attainment of knowledge is a cumulative process, systematically uncovering “general laws” that govern the natural world (Gorski, 2013). This philosophical position, known as *positivism*, can be characterised by its supposition that scientific claims should be testable, based on observations, and independent of the personal position of the investigator (Porpora, 2015).

The positivist position was subjected to increasing criticism in the second half of the 20th century, with detractors questioning the claim that our observations can provide an accurate depiction of the world. Known as the *epistemic fallacy* (Bhaskar, 1997), this central critique of positivism suggests that it mistakenly equates epistemology (i.e., our knowledge of things) with *ontology* (the actual nature of things). Anti-positivist and postmodernist schools of thought such as *interpretivism* and *social constructionism* reject the notion espoused by traditional scientific approaches that generalisable laws can be applied to the study of social beings. Instead, they posit that social life is governed by meanings which change across place and time (Gorski, 2013), and while researchers can aim to render social phenomena comprehensible by reconstructing these meanings, this does not constitute an objective static reality. Stronger variants of this approach can lead to a form of epistemic relativism (Gorski, 2013): by accepting the idiosyncratic ways in which forces such as language and power necessarily shape our perception of the world, how can one occupy a neutral position from which the merits of various ontologies can be adjudicated? Following this line of reasoning, the existence of an independent reality is cast into doubt, as all things are acted on by contextual forces.

A *critical realist* (Bhaskar, 1997) stance seeks to synthesise and reconcile elements of positivist and postmodern thought. It acknowledges that attempts to access the nature of reality will be influenced by multiple levels of bias (e.g., individual, systemic, cultural) which unavoidably accompany human experience (Porpora, 2015). In this sense it is *critical*, as opposed to *naïve* positivism. At the same time, it refutes the notion that our individual ways of relating with the world preclude the existence of an external reality, independent of social agents. The assumption of this independent reality makes it *realist*.

This thesis adopts a critical realist stance, firstly as it takes the position that the observed markers of social inequality are not solely socially constructed, but reflect differences in the material world. Whilst acknowledging the limitations involved in uncovering the mechanisms involved in these inequalities, the theoretical approach promises a more nuanced appreciation of multi-level contextual causal factors than the “general law” approach offered by positivism or the discursive approach favoured by postmodernism (Porpora, 2015). As critical realists highlight how our view of the world is shaped by our various biases, this therefore also applies to our understanding of bias itself. Borsboom, Mellenbergh, and Heerden, (2004) caution that claims about the validity or variable of a measure imply assumptions about the psychological attribute it supposedly measures. It is in keeping with the critical realist view that both instruments (e.g., the IAT) and categories (e.g., bias) are subject to a continual process of reflection and review as more insights are gained from their investigation (Gorski, 2013).

2.2. Design

A quantitative, quasi-experimental between groups design was used in this study. Participants’ scores for each measure of implicit and explicit bias towards age, skin-tone, weight, sexuality, and (trans-) gender were the dependent variables. The independent variable was participant type (Trainee Clinical Psychologist versus UK general population). The between groups design allows for comparisons of performance on a specific measure between different groups, which corresponds with the study’s aim of exploring differences in implicit bias between trainee psychologists and the general public. A

correlational design was employed to explore the relationship between measures of implicit and explicit bias.

2.3. Ethical Considerations

2.3.1. Ethical Approval

The research was approved by the University of East London's School of Psychology Research Ethics Committee pending minor amendments (see Appendix B). Requested amendments included providing an example of the information shared on social media pages to invite participants (Appendix C). The committee also advised greater emphasis to be placed on the potential distress involved in taking the tests, which was reflected in an updated participant information sheet (Appendix D).

2.3.2. Consent

The first page of the study website provided participants with information about the nature of the study (Appendix D). The information included the researcher and supervisors' contact details. Upon continuing, participants were directed to a consent form (Appendix E). Agreement with all statements was required before participants could proceed with the study. Participants were informed that they had to be aged 18 years or over in the invitation and information sheets (see 2.9.1. for inclusion and exclusion criteria). The demographic information page which followed the consent form required a value of "18" or above to be entered in the age box before participants could proceed. Participants' right to withdraw from the study at any time without giving a reason was stated in the participant information sheet and consent form.

2.3.3. Confidentiality & Data Protection

Participants were allocated a unique number to identify their results in the study database. No identifying information was collected when obtaining consent or as part of the study tasks. Participants were informed that (if enabled by their browser settings) cookies would be installed on their computer to track their progress, allowing them to return to complete further tests at a later time. The data stored on cookies on participants' computers did not contain any study

results or reaction time data. Cookies were solely used to store study progress information to minimise the possibility of participants completing the study more than once; and to ensure participants who completed the study over more than one session did not complete the same task twice. Email addresses were collected from participants who wished to be entered into a voucher prize draw. As this data contained potentially identifying information, it was stored entirely separately from the research data and was not linked to participants' unique identifying number.

2.3.4. Protection of Participants

Before proceeding to the study, participants were informed that they might find aspects of the tests and the feedback they receive challenging. Upon completion of each test, contact details of external organisations which offer support were presented alongside the results (Appendix F). The researcher's contact details were also provided again on this page. Every effort was made during all stages of the study to ensure the gathered data remained secure. Secure servers were used, and, once downloaded, data was stored on an encrypted external hard drive which the researcher kept physically secure. The identity of participants was not known to the researcher from the data.

2.4. Procedure

2.4.1. Website Procedure

After clicking on the provided study link, participants were taken to the first page of the website which contained the study information. Following their consent to participate, a cookie was saved to the participant's device containing their unique identifying number. The subsequent demographic questions page required age and location to be completed according to inclusion criteria in order to proceed. This then took the participant to their first IAT (presented in randomised order). The title of the IAT appeared before beginning the task. Once the IAT was completed, participants were directed to the corresponding measure of explicit bias for that category (two semantic differentials). Having completed these measures, participants were presented with their IAT score, with a possible interpretation and sources of further information and support. At

the bottom of this page, participants had the option to enter their email address to be entered in a voucher prize draw. Participants who chose to continue were taken to the starting page for the next IAT. This was also the page participants were directed to if they came back to the study at a later time and re-entered the web address. The procedure was repeated for each of the five IATs until completion. Further details on the main steps of the procedure are provided in the rest of this section.

2.4.2. Demographic Questions

After providing consent, participants were directed to set of demographic questions. They were asked to select options relating to their age, gender, sexual orientation, ethnicity, religion, highest attained educational qualification, location, and body mass index. Participants could choose not to provide values for most of these sections if they wished. Selecting the option of Trainee Clinical Psychologist or non-Trainee-/Clinical Psychologist was required before continuing to the tests.

2.4.3. Implicit Association Test

The IAT measures the relative strength of association between a category and an evaluative attribute (Lane et al., 2007). Both the categories and the attributes are conceptualised as binary and mutually exclusive (e.g., gay—straight; good—bad). The individual stimulus a participant is presented with can therefore be divided into one of four distinct groups: a) a positive evaluation (e.g., the word “good”), b) a negative evaluation (e.g., the word “bad”), c) a representation of one concept within a binary category (e.g., a picture of two men holding hands to represent “gay”), and d) a representation of the other category concept (e.g., a picture of a man and a woman holding hands to represent “straight”). Each of the above concepts might be represented as words, symbols, or pictures.

When completing an IAT, participants are required to rapidly classify a stimulus that appears on the screen into one of two category-attribute pairings using one of two keyboard keys. For example, in the Sexuality IAT, the categories gay and straight may be presented alongside the attributes “good” and “bad”

respectively. This would require the participant to sort representations of “gay” as well as positive words into the same group (e.g., by pressing the “E” key). Stimuli representing “straight”, as well as negative words, would conversely be sorted into the other group (e.g., using the “I” key). As outlined in the introduction, the underlying assumption is that categories and evaluations that are more closely associated will yield faster and more accurate responses. A seven-block IAT was used, which has become the standard IAT structure employed in contemporary studies (Lane et al., 2007) as it incorporates practice trials and a balancing of keys used for different concepts. Administration procedures were closely aligned to those of *Project Implicit* to enable a valid comparison of data sets. Founded by IAT researchers Greenwald, Banaji, and Nosek in 1998, Project Implicit is a Harvard University-affiliated online repository of a number of IATs and information on implicit social cognition. The IATs available on the website (most notably the “Race” IAT) have been taken over 17 million times by people across the globe (Kassin, Fein, & Markus, 2016). The collected data is regularly made available via the Open Science Framework. The structure of the seven-block computerised IAT is illustrated in Table 2 using the example of the Sexuality IAT. Further details regarding the procedure can be found in Appendix I.

Table 2: Seven-block IAT structure (sexuality IAT example)

Block	No. Trials	Function	Left Key (Order 1)	Right Key (Order 1)	Left Key (Order 2)	Right Key (Order 2)
1	20	Practice	Bad	Good	Good	Bad
2	20	Practice	Gay People	Straight People	Gay People	Straight People
3	41	Trial 1 Practice Trials 2-41 Test	Bad + Gay People	Good + Straight People	Good + Gay People	Bad + Straight People
4	41	Trial 1 – Practice Trials 2-41 Test	Bad + Gay People	Good + Straight People	Good + Gay People	Bad + Straight People
5	20	Practice	Good	Bad	Bad	God
6	41	Trial 1 Practice Trials 2-41 Test	Good + Gay People	Bad + Straight People	Bad + Gay People	Good + Straight People
7	41	Trial 1 Practice Trials 2-41 Test	Good + Gay People	Bad + Straight People	Bad + Gay People	Good + Straight People

To minimise order-related confounds, the order in which pairings were presented was alternated between participants and the order of trials was randomised (Teige-Mocigembe et al., 2010). The order in which participants could take the 5 IATs was also randomised. The task instructions encouraged participants to respond as quickly and accurately as they could to minimise the influence of conscious deliberation (Fiedler et al., 2006).

2.4.4. Self-ratings of Attitudes

Explicit bias was captured using semantic differentials, which ask participants to rate how warmly or coldly they felt toward category concepts on a 10-point scale. All ten measures (two for each of the categories) can be found in Appendix H.

2.5. Stimuli

The previous chapter identified some of the issues that could arise due to the characteristics of stimuli used in the IAT. An acknowledged limitation of Blencowe's (2017) study was the quality of the stimuli used. These were the same as those used by Project Implicit and so point to a more general problem in the area. Therefore, this study aimed to develop new stimuli which were more ecologically valid representations of the investigated concepts and less vulnerable to construct-unrelated contamination. The development of each set of stimuli is outlined below. Across IATs, each target concept (e.g., old or young) was composed of six stimuli, as was each target attribute (e.g., good or bad).

As part of the validation process, a small sample ($n=10$) of the general population was asked to rate how well the created stimuli corresponded to each category. The sample comprised equal numbers of men and women who were known to the researcher. These participants were asked how well they thought individual (word-/picture-) stimuli represented a concept such as "old" or "young" on a scale of 1-100. Overall, the new stimuli were judged to be good representations of the concepts of interests, with ratings above 95 of 100 from all participants. The stimuli discussed below can be found in Appendix G.

2.5.1. Skin-tone

Due to the different demographic makeup of the UK compared to the US, the “Race” IAT is not suitable for UK use as it compares Black African Americans with White European Americans. The skin-tone IAT (also available from Project Implicit) requires participants to differentiate between dark- and light-skinned faces. The stimuli are drawings of faces, onto which a light or dark skin tone is applied monochromatically. As these stimuli lack realism, a set of updated target stimuli was created using face generation software (see Apparatus). Skin-tone and facial features (features, such as nose, lips, and eyes, which are associated with certain ethnicities) have been shown to exert independent effects on people’s evaluation of faces (Hagiwara, Kashy, & Cesario, 2012). Consequently, faces were created with composite facial features from several ethnic groups. Four face pairs were created, with each differing only in skin-tone. Efforts were made to match the colours to catalogued human skin-tones (Strochlic, 2018). Faces were symmetrical, with neutral expressions, identical orientation and positioning.

2.5.2. Age

Age stimuli used by Project Implicit comprise cropped black and white photos of younger and older adults. To address potential confounds including facial expression, face position, orientation, and perceived similarity/familiarity, a new set of stimuli was generated. As with the skin-tone stimuli, these controlled for variables such as face symmetry, allowing age to be the only manipulated variable. The ethnic diversity of the faces was also increased compared to the previous all-White set. This was matched equally across young and old stimuli.

2.5.3. Weight

The weight stimuli used by Blencowe (2017) were identified as problematic. In a desire to control for individual differences, photos of faces had been digitally altered to create a thin and fat version of the same face. However, the resulting distortions led to an unnatural appearance, especially in the case of the “fat” stimuli. This limitation was previously recognised by Marini et al. (2013) in an international study of weight bias, in which whole-body silhouettes representing

fat and thin people were used instead. These stimuli were requested from the researchers and used in this study.

2.5.4. Sexuality

The majority of studies researching implicit cognitions in relation to sexuality (e.g., Burke et al., 2015) have used the version of the IAT made publicly available by Project Implicit. This version uses words and basic symbols (e.g., of two men or women holding hands) to represent gay or straight target concepts. However other prominent studies (e.g., Banse et al., 2001) have employed photographs of couples to evoke the same concept. Foroni and Bel-Bahar (2010) point out that word- and picture-IATs are often used interchangeably under the assumption that they capture the same attitudinal associations, but that their properties are rarely directly compared.

Investigations into the influence of stimulus modality (e.g., Foroni & Bel-Bahar, 2010; Meissner & Rothermund, 2015) on IAT effects have frequently shown greater effects in those tests (e.g., flower—insect, young—old) using words for the target categories. Whether this relationship also holds true for the sexuality IAT is unclear. Findings suggesting images are more emotionally evocative than words (Kensinger & Schacter, 2006) and that images associated with gay people can elicit a greater disgust response (Inbar, Pizarro, Knobe & Bloom, 2009) beg the question of how these two types of IAT stimuli may differ in regard to their effect sizes.

To explore this, a new sexuality picture-IAT was created to allow comparison to the one employed by Blencowe (2017) and Project Implicit. Stock photos of same- and different-sex couples were used to represent the concepts gay and straight. As much as possible, the stimuli were matched across both target concepts in terms of size, position, expression, represented ethnicities and “concept indicator” (e.g., holding hands, kissing, etc.). The gay category included an equal number of male-male and female-female pictures.

2.5.5. Gender Identity

2.5.5.1. *Consultation*

Transgender organisations and charities were approached to offer guidance on appropriate stimuli to include in the Gender Identity IAT. It was decided that a test differentiating trans- from cisgender individuals through photographs would not be satisfactory due to the diversity of trans experience and appearance. Mizock and Hopwood (2016) highlight the pertinent issue of *passing privilege* (i.e., the ability to “pass” as cisgender) amongst trans people, which influences experiences of discrimination and dispels the notion of being able to distinguish between trans and cis people based on appearance. Instead, a version of the IAT based on concept-related words was deemed preferable. Meisner and Rothermund’s (2015) summary of research showing satisfactory effects for word-IATs as well as Wang-Jones et al.’s (2017) word-based Transgender IAT supported this decision.

2.5.5.2. *Creation and Piloting*

Suitable stimuli to include were guided by advice from transgender organisations (Mermaids UK, GIRES) and feedback from the (cisgender) pilot sample. An acknowledged challenge of this process was the identification of suitable words to sensitively and accurately capture the gender constructs that were also understood by the general population (Gleason, 2016; Wang-Jones et al., 2017). In keeping with Steffens et al.’s (2008) guidance, variants of the concept labels were used as word stimuli. Two of the ten participants providing feedback on the stimuli shared that they had not known the term cisgender, however that its meaning had become clear when placed opposite transgender. The label cisgender (or simply cis) was maintained as it accurately captured the desired construct (unlike, for instance, “biological” which is more closely associated with sex rather than gender) and as its meaning, even if previously unknown, became clear within context. The transgender IAT also included basic symbols representing transition from male to female, female to male, or remaining unchanged. These were analogous to the symbols used in the most commonly researched version of the Sexuality IAT, which is composed of a similar set of concept labels and symbols. In keeping with the literature

recommendations (Lane et al., 2007), gender-related word stimuli were displayed in a different font, colour, and size to attribute words.

2.5.6. Target Attributes

Evaluative words used to represent positive and negative attributes remained largely similar to those used in previous research. Following feedback received in the piloting stage, words such as “abuse” in the age category and “attractive” across categories were substituted for other negative or positive attribute words to ensure their relevance to the construct of interest (see Steffens & Plewe, 2001).

2.6. Apparatus

This study used the same technical setup as Blencowe (2017), operating the following software for stimuli creation, development of the web application, and analysis:

- Face generation software: FaceGen Artist Home V1.11, 64-bit for Windows. The programme allows the manipulation of many facial features, age, skin-tone, etc., based on 3-dimensional human face scans. This software has seen application in other psychological research on face recognition (e.g., Lick, Cortland, & Johnson, 2016).
- Web Server: Apache HTTP Server V2.4.23, 32-bit for Windows for development environment; 32bit for Linux for live environment.
- Database server: MySQL Server V8.0.11
- Database tool for data migration: MySQL Workbench 6.3.10, 64-bit for Windows.
- Data analysis: SPSS V23 for Windows.

Participants could access the study website via a link which was included in the invitation to participate. A desktop or laptop computer was required to participate, and access from mobile devices (e.g. mobile phone, tablet) informed users of this.

2.7. Scoring and Interpretation

2.7.1. IAT

IAT effects were calculated according to the following recommendations stipulated by Greenwald et al. (2003):

- Trial blocks 1, 2, and 5, along with the first trial in the remaining trial blocks (3, 4, 6, and 7; see Table 2) were excluded from the D-score calculation as these were practice trials.
- Trials with response latencies greater than 10,000 milliseconds were excluded due to the reduced likelihood of capturing implicit associations.
- Participants whose response latencies were below 300 milliseconds for over 10% of trials on an IAT had this D-score excluded from the analysis.
- The mean latency for responses was computed for each of stages 3, 4, 6, and 7.
- For administration order 1: Computation of the two mean differences as $[M(\text{Block6}) - M(\text{Block3})]$ and $[M(\text{Block7}) - M(\text{Block4})]$.
- For administration order 2: Computation of the two mean differences as $[M(\text{Block3}) - M(\text{Block6})]$ and $[M(\text{Block4}) - M(\text{Block7})]$.
- Difference scores were then individually divided by the standard deviation for both trial blocks used to calculate the standardised difference score.
- The D-score was calculated as the equal-weight average of the two resulting ratios.

The above procedure allowed for D-score results within a range from -2.0 to 2.0. A score of zero signified no difference in response latency between conditions. The interpretation of the score as demonstrating slight, moderate or strong associations is based on the standard criteria for small, medium and large effect sizes of Cohen's d measure (Sedlmeier & Gigerenzer, 1989). If the proportion of participants' errors or the number of response latencies below 300 milliseconds exceeded 10% of test trials, an interpretation of the IAT score was not provided.

2.7.2. Self-rated Attitudes

Semantic differential scores were calculated in line with Nosek and Smyth's (2007) recommendations. Scores between -10 and +10 were calculated for each of the measures. Positive scores reflected a greater level of association or liking of the first category. For example, a participant who rated themselves six out of ten in their warmth towards thin people and three out of ten towards fat people would score +3 if thin people were the first option.

2.8. Participants

2.8.1. Inclusion and Exclusion Criteria

Participants were required to be aged 18 or over, resident in the United Kingdom, and sufficiently proficient in the English language to understand the task instructions. Access to a desktop or laptop computer with internet access was required. This was due to the incompatibility of the website with mobile and touchscreen devices and a desire to ensure that participants were taking the test with a large enough screen size. This requirement may have excluded people who rarely or never access the internet, and a growing minority who solely access the internet via mobile devices (ONS, 2017).

2.8.2. Sample Size

Power calculations were performed using G*Power V3.1.9.2. These indicated that a sample size of 107 participants per group were required for a moderate effect size to be detected in a univariate analysis of covariance. Further calculations indicated a sample size of 63 was needed for a sufficiently powered bivariate correlation among explicit and implicit variables. Therefore, a minimum of 107 participants from each group completing all 5 IATs were deemed necessary.

2.8.3. Recruitment

The study was advertised on social media and via email. Moderators and administrators of relevant Facebook and Reddit pages (e.g., related to psychology, transgender issues) were contacted to ask for permission to post

recruitment adverts (Appendix C). The researcher also emailed personal contacts to invite participation.

2.8.4. Sample Characteristics

2.8.4.1. *Trainee Clinical Psychologists*

Twenty-eight Trainee Clinical Psychologists participated in the study. Of these, 24 (85.7%) were female and 4 (14.3%) were male. Average age was 31.2 years old (SD = 4.71; range = 26 to 45). Twenty-one trainees (75%) stated their sexuality as straight, with 25% identifying as lesbian, gay, bisexual (LGB) or other. The sample predominantly reported their ethnicity as White (78.5%). The vast majority of trainees reported not belonging to any religion (82.1%), with 7.1% “preferring not to say” and the remaining trainees’ belonging to different religions.

These characteristics were compared to the latest available data on trainees accepted onto UK training courses from the Clearing House for Postgraduate Courses in Clinical Psychology (2017). A series of chi-square goodness-of-fit tests were conducted to indicate whether the study sample reflected the demographic characteristics of the wider UK trainee population. The study sample’s proportion of females and males corresponded to national figures (84% and 16% respectively). Nationally, a greater proportion of trainees reported their sexuality as straight (87%), and sexuality distribution was found to differ significantly ($p < .005$) between the sample and national figures. Religiosity also differed significantly ($p < .005$), with a notably lower percentage of UK trainees overall reporting not to be religious (63%). Despite the proportion of ethnicities ranking in the same order in national and study figures, a one-sample chi-squared test suggested a significant difference ($p < .005$), with the largest discrepancies percentage-wise to be found amongst White (underrepresented in the recruited sample) and mixed (overrepresented in the recruited sample) ethnicities. Average ages could not be statistically compared due to division into age groups but were approximately representative.

2.8.4.2. General Population

Following the exclusion of ineligible participants and outliers (see Results), 172 members of the general population were included in the analysis. Males made up 47.4% of the sample, with females comprising 40.9% and the remaining 11.7% comprising those who identified as trans male, trans female or non-binary. Age ranged between 18 and 66 years ($M = 33.2$; $SD = 13.26$). Sexuality was reported as straight for 71.3%, with 28.7% identifying as LGB or other. Ethnicity was reported as White for 91.2%, with the remainder comprising a variety of ethnicities. Most participants (70.8%) reported not belonging to a religion, and the majority of religious participants were Christian (20.5%).

A series of chi-square goodness-of-fit tests were carried out to compare the study sample to population estimates from the latest available UK census data (ONS, 2016). These found the recruited participants' ethnic distribution to be in line with estimates of the UK population. Analyses revealed the educational level of the recruited sample and their reported religion to diverge very significantly from national figures ($p < .001$). While the proportion of UK adults with a university qualification is estimated at 27% (ONS, 2016) the study's non-trainee participants who had attained an undergraduate degree or higher was 71.3%. The significant difference in religiosity can be understood by considering how the above rates compare with official figures, with 59.3% of the population professing to be Christian and approximately a quarter reporting not belonging to a faith group. Despite the ONS (2016) not publishing figures on mean age in the UK, the national median age has most recently been estimated at 40 years of age. This is significantly older than the sample's median age of 29.5 years.

As expected, some of the largest discrepancies are to be found in regard to reported gender and sexuality, as this study aimed to recruit greater numbers of LGBT participants. Although the ONS does not collect data on transgender individuals, estimates by Reed et al. (2009) suggest national figures of less than 0.5%. Similarly, ONS figures put LGB sexual identity at 4% nationally, which is many magnitudes below the study sample, and accounts for the highly significant ($p < .001$) difference between national estimates and participant characteristics. Further demographic information is provided in Table 3.

Table 3: General Population and Trainee Characteristics

	General Population (n=171)		Trainee Clinical Psychologists (n=28)	
Age	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	33.17	13.25	31.21	4.71
Gender	<i>n</i>	%	<i>n</i>	%
Female	70	40.9	24	85.7
Male	81	47.4	4	14.3
Trans Male	6	3.5	-	-
Trans Female	13	7.6	-	-
Non-binary	1	0.6	-	-
Sexuality	<i>n</i>	%	<i>n</i>	%
Bisexual	22	12.9	1	3.6
Gay Male	6	3.5	-	-
Lesbian Female	11	6.4	3	10.7
Heterosexual	122	71.3	21	75.0
Other	6	3.5	1	3.6
Prefer not to say	4	2.3	2	7.1
Ethnicity	<i>n</i>	%	<i>n</i>	%
White				
English	90	52.6	16	57.1
Scottish	6	3.5	1	3.6
Welsh	8	4.7	-	-
Other British	5	2.9	-	-
White (not specified)	31	18.1	2	7.1
Irish	4	2.3	2	7.1
Other White	9	5.3	1	3.6
Asian				
Asian (not specified)	3	1.8	1	3.6
Pakistani	1	0.6	-	-
Other Asian	1	0.6	-	-
Mixed				
Mixed (not specified)	2	1.2	2	7.1
White and Asian	2	1.2	1	3.6
White and Black African	1	0.6	-	-
Other mixed	1	0.6	-	-
Other (not specified)	4	2.3	1	3.6
Prefer not to say	3	1.8	1	3.6
Education	<i>n</i>	%	<i>n</i>	%
Postgraduate	57	33.3	24	85.7
Undergraduate	65	38.0	3	10.7
A-level	30	17.5	-	-
GCSE	8	4.7	-	-
None	2	1.2	-	-
Other	6	3.5	-	-
Prefer not to say	3	1.8	1	3.6

3. RESULTS

3.1. Data Included in Analysis

A total of 339 participants accessed the study website and began the study. In keeping with the commonly adopted IAT methodological protocol (Lane et al., 2007), participant data was excluded from analysis in the following cases:

- task aborted before completion
- trials with response latencies greater than 10,000 milliseconds
- response latencies below 300 milliseconds for over 10% of IAT trials
- data corruption, lack of demographic information

This resulted in 199 participants - 28 Trainee Clinical Psychologists (TCP) and 171 members of the general population (GenPop) – being included in the analysis. The majority of exclusions were attributable to lack of completion and the dropout-rate was comparable to that of Project Implicit.

3.2. Exploratory Data Analysis

Data were initially explored statistically (key parameters and moments) and visually to inform understanding of the data distribution and whether parametric assumptions were met. For small samples ($n < 50$; TCPs), z-scores for skewness or kurtosis above 1.96 indicate data are not normally distributed (Kim, 2013). A higher criterion value of 3.29 can be used with larger samples (e.g., GenPop), with a z-score above this level suggesting the data are skewed or kurtotic.

Investigation of the z-scores for skewness and kurtosis (Table 4) suggested age was not normally distributed. Amongst the general population, age had a z-score for skewness of 6.15 ($SE = 0.186$), and a z-score for kurtosis of 1.09 ($SE = 0.369$), with TCPs having a z-score for skewness of 3.39 ($SE = 0.441$) and a z-score for kurtosis of 2.05 ($SE = 0.858$). Further assessment by Shapiro-Wilk's test ($p < .05$) confirmed that age was not normally distributed in both groups (Table 4). This trend was supported by visual appraisal of the corresponding histograms (Appendix J).

Table 4: Participant Age

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>IQR</i>	<i>Skew. z-score</i>	<i>Kurt. z-score</i>	<i>Shapiro-Wilk Stat.</i>	<i>Sig.</i>
GenPop	33.17	13.25	18	75	15	6.15	1.09	0.87	0.00
TCP	31.21	4.71	26	45	5	3.39	2.05	0.83	0.00

Table 5: IAT D-score Distribution and Normality Statistics

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Skew. z-score</i>	<i>Kurt. z-score</i>	<i>Shapiro-Wilk Stat.</i>	<i>Sig.</i>
Skin-tone	GenPop	82	-0.41	0.39	-1.24	0.64	0.93	-0.64	0.99	0.64
	TCP	20	-0.45	0.43	-1.21	0.49	0.33	-0.17	0.98	0.95
	All	102	-0.42	0.39	-1.24	0.64	0.92	-0.70	0.99	0.61
Age	GenPop	79	-0.34	0.38	-1.22	0.79	0.52	0.11	0.99	0.88
	TCP	19	-0.07	0.36	-.69	0.86	1.60	1.13	0.94	0.25
	All	98	-0.28	0.39	-1.22	0.86	0.88	0.63	0.99	0.56
Weight	GenPop	84	-0.23	0.39	-1.23	0.64	0.12	-0.56	0.99	0.65
	TCP	19	-0.01	0.55	-0.95	0.86	-0.21	-1.11	0.95	0.44
	All	103	-0.19	0.43	-1.23	0.86	0.71	-0.79	0.99	0.63
Sexuality	GenPop	86	-0.07	0.44	-1.10	0.93	1.12	-1.22	0.98	0.12
	TCP	20	0.16	0.45	-0.56	1.10	0.72	-0.68	0.95	0.39
	All	106	-0.03	0.45	-1.10	1.10	1.26	-1.26	0.98	0.10
Gender Identity	GenPop	81	-0.04	0.45	-1.10	1.00	0.74	-0.13	0.99	0.47
	TCP	19	-0.05	0.33	-0.77	0.48	-1.40	0.69	0.93	0.20
	All	100	-0.04	0.43	-1.10	1.00	0.54	0.17	0.98	0.30

3.3. IAT Scores

3.3.1. Overview

A total of 509 IATs were completed by participants. Statistical exploration of skewness, kurtosis and normality suggested that all IAT scores were normally distributed for both groups of participants. Table 5 shows the mean IAT scores (D-scores) of each group, together with the overall average. Negative scores indicate an implicit preference for the dominant group, with scores > 0.1 indicating a slight preference, scores > 0.3 indicating a moderate preference, and scores > 0.5 indicating a strong preference.

Both groups had an average IAT score of below -0.3 in the skin-tone and weight conditions. Neither group averaged below or above the $-0.1/+0.1$ D-score threshold on the Gender Identity IAT. The general population had an average D-score of below -0.3 in the age condition, whereas TCPs' average score did not exceed threshold levels. In the sexuality condition, overall GenPop scores did not exceed threshold, whereas TCP scores exceeded the 0.1 D-score mark.

As both samples were made up of demographically diverse participants, further analyses were conducted to establish whether other group identifiers were predictors of implicit bias. A closer investigation of the general population sample recommended itself due to the greater sample size and variation in regard to gender, age and education. Due to fewer than 10% of participants reporting their ethnicity as non-white, this did not provide large enough numbers for any meaningful ethnicity-based comparisons to be made and was thus not statistically investigated.

3.3.2. Gender

The number of participants identifying as “trans male”, “trans female” and “non-binary” was insufficient to include separately in a robust statistical analysis of gender-related difference. Therefore, these three categories were collapsed into a category labelled “other” and compared alongside the gender categories (cis-) “male” and “female”. It was hypothesised that there were sufficient similarities between these sub-groups to warrant their amalgamation, chiefly their status of being non-cisgender.

A series of one-way analyses of variance (ANOVAs) were conducted to determine if scores on the five IATs differed between gender groups. This method of analysis was chosen as the ANOVA compares all means simultaneously and maintains the type I error probability at the designated level (5%), as opposed to the increased probability of type I error presented by multiple t-tests (Field, 2009). Data were normally distributed for each group, as assessed by Shapiro-Wilk's test ($p > .05$). In the case of the Gender Identity IAT, homogeneity of variances was violated, as assessed by Levene's Test of Homogeneity of Variance ($p = .022$). Therefore, a Brown-Forsythe test was used to contrast the groups.

The results are presented in Table 6. Gender Identity IAT score was found to be significantly different by gender group, Brown-Forsythe's $F(2,38.52) = 7.330$, $\eta^2 = .370$, $p = .002$. Post hoc comparisons using the Tukey HSD test revealed that the difference in mean score was significant between cis female and "other", as well as between cis male and "other", with both cis groups showing a greater pro-cis bias. There was no significant difference between male and female cis groups, although male scores had a greater pro-cis bias.

Sexuality IAT score was also found to be significantly related to participant gender group, $F(2,83) = 5.273$, $\eta^2 = .336$, $p = .007$; as was Weight IAT score to a lesser extent, $F(2,81) = 3.371$, $\eta^2 = .277$, $p = .039$. Tukey post hoc analyses indicated that the significant differences in mean scores could be attributed to the greater level of male bias against the respective marginalised group (e.g., gay, overweight) compared to the "other" gender category in both cases.

Table 6: Relationship between General Population Gender and IAT Scores

<i>IAT</i>	<i>Gender</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>eta</i>
Skin-tone	<i>F</i>	41	-0.41	0.38	0.15	0.86	0.06
	<i>M</i>	34	-0.43	0.41			
	<i>Other</i>	7	-0.34	0.30			
Age	<i>F</i>	35	-0.23	0.35	3.10	0.05	0.28
	<i>M</i>	37	-0.45	0.38			
	<i>Other</i>	7	-0.27	0.40			
Weight	<i>F</i>	35	-0.21	0.40	3.37	0.04	0.28
	<i>M</i>	39	-0.31	0.34			
	<i>Other</i>	10	0.03	0.45			
Sexuality	<i>F</i>	39	-0.01	0.45	5.27	0.01	0.34
	<i>M</i>	36	-0.22	0.41			
	<i>Other</i>	11	0.22	0.38			
Gender Identity	<i>F</i>	42	-0.06	0.50	7.33*	0.00	0.37
	<i>M</i>	30	-0.14	0.31			
	<i>Other</i>	9	0.42	0.37			

*Brown-Forsythe test statistic

3.3.3. Sexuality

In order to enable a satisfactory statistical analysis of the effect of sexuality on IAT scores, the categories “gay”, “lesbian”, “bisexual” and “other” were combined under the label “other” and compared against the group of participants identifying as “straight”. A series of one-way ANOVAs was conducted to determine if scores on the five IATs differed significantly between the two sexuality groups. Data were normally distributed for each group, as assessed by Shapiro-Wilk’s test ($p > .05$). Homogeneity of variance was confirmed by Levene’s test ($p > .05$).

As hypothesised, there was a large effect size of sexuality on sexuality IAT score ($\eta = .416$), with those in the “other” category more likely to display a pro-gay bias. A significant association between skin-tone IAT score and sexuality was also found ($\eta = .268$), with non-straight participants displaying a stronger pro-light skin bias (see Table 7).

Table 7: Relationships between General Population Sexuality and IAT Scores

<i>IAT</i>	<i>Sexuality</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	<i>Straight</i>	57	-0.26	0.37	6.18	0.02	0.27
	<i>Other</i>	25	-0.48	0.38			
<i>Age</i>	<i>Straight</i>	54	-0.34	0.39	0.00	0.97	0.00
	<i>Other</i>	25	-0.34	0.37			
<i>Weight</i>	<i>Straight</i>	56	-0.26	0.38	1.34	0.25	0.13
	<i>Other</i>	28	-0.16	0.39			
<i>Sexuality</i>	<i>Straight</i>	57	-0.20	0.41	17.60	0.00	0.42
	<i>Other</i>	29	0.18	0.40			
<i>Gender Identity</i>	<i>Straight</i>	56	-0.06	0.45	0.47	0.49	0.08
	<i>Other</i>	25	0.01	0.46			

3.3.4. Education

The six educational levels (ranging from “no formal qualification” to “postgraduate”) were grouped into two categories to provide more evenly-sized comparison groups. Participants whose highest attained educational qualifications were undergraduate or postgraduate were grouped into “higher education” while the remaining participants were grouped into “lower education”.

One-way ANOVAs were again conducted to determine if scores on the five IATs differed significantly between the two educational groups. Data were normally distributed for each group, as assessed by Shapiro-Wilk’s test ($p > .05$) and homogeneity of variance was confirmed by Levene’s test ($p > .05$). Of the five investigated IATs, Gender Identity IAT score was found to relate to educational group, with those in the “lower education” group significantly more likely to show an implicit pro-trans bias, $F(1,79) = 4.512$, $\eta^2 = .232$, $p = .037$.

Table 8: Relationships between General Population Education and IAT Scores

<i>IAT</i>	<i>Education</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	<i>Higher Ed</i>	61	-0.41	0.39	0.01	0.94	0.01
	<i>Lower Ed</i>	21	-0.42	0.40			
<i>Age</i>	<i>Higher Ed</i>	57	-0.35	0.36	0.42	0.52	0.07
	<i>Lower Ed</i>	22	-0.29	0.43			
<i>Weight</i>	<i>Higher Ed</i>	62	-0.24	0.37	0.21	0.65	0.05
	<i>Lower Ed</i>	22	-0.19	0.45			
<i>Sexuality</i>	<i>Higher Ed</i>	63	-0.06	0.48	0.17	0.68	0.05
	<i>Lower Ed</i>	23	-0.11	0.33			
<i>Gender Identity</i>	<i>Higher Ed</i>	59	-0.10	0.43	4.51	0.04	0.23
	<i>Lower Ed</i>	22	0.13	0.46			

3.3.5. Age

Participant age was explored for possible effects on IAT score. Due to the non-parametric distribution of age within the samples, Spearman's correlation was employed (see Table 9). No reliable relationship between age and IAT scores were found.

Table 9: Correlations between General Population Age and IAT Scores

<i>IAT</i>	<i>Age</i>	
	<i>ρ_s</i>	<i>p</i>
<i>Skin-tone</i>	0.06	0.62
<i>Age</i>	-0.02	0.86
<i>Weight</i>	0.02	0.87
<i>Sexuality</i>	-0.12	0.25
<i>Gender Identity</i>	-0.07	0.51

3.3.6. Between-IAT Correlations

Correlations between the different IAT scores were explored for the general population. Results are found in Table 10. A bivariate Pearson's correlation established that there was a significant relationship between weight D-score and sexuality D-score, $r(52) = .374$, $p = .006$, as well as between gender identity D-score and Age D-score, $r(60) = .460$, $p < .001$. Weaker relationships were found between age- and skin-tone D-scores, weight- and skin-tone D-scores, gender-identity- and skin-tone D-scores, as well as sexuality- and age D-scores (see Table 10).

Table 10: Correlations between General Population IAT Scores

<i>IAT</i>	<i>1</i>		<i>2</i>		<i>3</i>		<i>4</i>	
	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>
1 Skin-tone								
2 Age	0.33*	0.02						
3 Weight	0.32*	0.02	0.25	0.06				
4 Sexuality	0.22	0.09	0.27*	0.05	0.37**	0.01		
5 Gender Identity	0.31*	0.03	0.46**	0.00	0.24	0.08	0.21	0.11

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

3.3.7. Trainee Clinical Psychologists

The trainee sample comprised four males and 24 females, making an exploration of contrasts between IAT scores based on gender groups unfeasible. The similar level of education inherent in the sample's nature precluded an investigation of related differences in this domain as all were enrolled in post-graduate education. A non-parametric Spearman's correlation was performed to ascertain whether age was associated with scores, but did not provide any significant results (see Table 11).

As a quarter of trainees identified as being either gay, lesbian, bisexual or other, this group was combined and compared to the group of straight TCPs. Due to the smaller sample size, a series of non-parametric Mann-Whitney U tests were run to determine whether there were differences in IAT score based on trainee sexuality (Table 12).

Sexuality was not related to any IAT score amongst TCPs. Despite the lack of significance, it should be noted that the Sexuality IAT was close to significance at $p = .054$, with a large effect size of $\eta = .449$. Its non-significance may be attributable to small participant size. A visual appraisal of Table 12 confirms that those in the non-straight group had a strong implicit pro-gay bias (D-score > 0.5) on average, whereas straight trainees are on average just short of having a slight pro-gay bias (D-score > 0.1).

Table 11: Correlations between Trainee Clinical Psychologist Age and IAT Scores

<i>IAT</i>	<i>Age</i>	
	<i>ρs</i>	<i>p</i>
<i>Skin-tone</i>	-.037	0.88
<i>Age</i>	-.24	0.33
<i>Weight</i>	-.28	0.25
<i>Sexuality</i>	.26	0.27
<i>Gender Identity</i>	-.26	0.28

Table 12: Relationships between Trainee Clinical Psychologists' Sexuality and IAT Scores

<i>IAT</i>	<i>Sexuality</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>U</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	<i>Straight</i>	14	-0.39	0.47	30	0.35	0.23
	<i>Other</i>	6	-0.60	0.33			
<i>Age</i>	<i>Straight</i>	14	-0.12	0.25	43	0.50	0.17
	<i>Other</i>	5	0.08	0.58			
<i>Weight</i>	<i>Straight</i>	14	0.02	0.53	31	0.75	0.09
	<i>Other</i>	5	-0.09	0.66			
<i>Sexuality</i>	<i>Straight</i>	17	0.09	0.44	50	0.05	0.45
	<i>Other</i>	5	0.57	0.22			
<i>Gender Identity</i>	<i>Straight</i>	15	-0.06	0.36	29	0.96	0.02
	<i>Other</i>	4	0.01	0.18			

3.4. Self-reported Attitudes

3.4.1. Overview

Each IAT included in the analysis had a corresponding self-reported “thermometer” attitude scale score. These scales asked participants to rate how warmly they felt towards a certain group on a scale from one to ten. Thermometer scores were calculated by subtracting the rating of the dominant group from that of the less dominant group. For example, if a participant rated their feelings towards gay people as 6/10 and towards straight people as 7/10, then the thermometer score would be -1. In this respect, this measure of explicit bias was comparable to the IAT scoring, in that a negative score indicated dominant group preference.

A full breakdown of thermometer scores between groups including skewness, kurtosis and normality of distribution can be found in Table 13. Unlike IAT scores, Shapiro Wilk’s test suggested that none of the feelings thermometer scores were normally distributed ($p < .05$).

The scores in Table 13 show that both trainee and general population groups reported an explicit-pro thin bias and pro-cisgender bias on average. The general population sample was also more likely to report a preference for light-skinned people. As with IAT scores, further analyses were conducted to establish whether other group identifiers were predictors of participant’s self-reported attitudes. Participants were grouped together in the same way as above.

Table 13: Thermometer score distribution and normality statistics

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Skew. z- score</i>	<i>Kurt. z- score</i>	<i>Shapiro- Wilk Stat.</i>	<i>Sig.</i>
Skin-tone	GenPop	82	-0.23	1.01	-5	4	-2.85	17.62	0.68	0.00
	TCP	20	0.55	0.94	0	3	2.96	1.07	0.64	0.00
	All	102	-0.08	1.04	-5	4	-1.58	15.79	0.72	0.00
Age	GenPop	79	-0.34	2.34	-10	5	-4.78	8.94	0.84	0.00
	TCP	19	1.21	1.40	-1	3	-0.02	-1.31	0.89	0.03
	All	98	-0.04	2.27	-10	5	-5.54	10.15	0.86	0.00
Weight	GenPop	84	-0.64	2.20	-10	8	-2.00	11.27	0.82	0.00
	TCP	19	-0.26	2.49	-6	4	-1.90	1.80	0.86	0.01
	All	103	-0.57	2.25	-10	8	-2.46	9.74	0.84	0.00
Sexuality	GenPop	86	0.10	2.30	-8	10	1.50	11.61	0.79	0.00
	TCP	20	0.20	1.99	-6	3	-3.22	4.34	0.80	0.00
	All	106	0.12	2.23	-8	10	0.65	11.96	0.80	0.00
Gender Identity	GenPop	81	-0.27	2.20	-10	7	4.22	14.25	0.69	0.00
	TCP	19	-0.37	1.83	-6	2	4.06	4.84	0.69	0.00
	All	100	-0.29	2.13	-10	7	5.13	15.17	0.70	0.00

3.4.2. Gender

As thermometer scores were found not to be normally distributed across domains, a Kruskal-Wallis test was conducted to determine if scores across the five categories differed significantly between gender groups amongst the general population. Attitudes towards sexuality and transgender people were significantly predicted by participant gender: ($p = .029$ and $p = .001$, respectively) with large effect sizes (see Table 14). Participants in the “other” (e.g., trans, non-binary, other) category scored much higher on their attitudes towards gay and trans people. This is consistent with expectations, as these participants will either identify as trans, or at least non-cis. Furthermore, far higher proportions of non-cis people also report to be “non-straight” (Meyer, 2015). Apart from attitudes towards skin-tone, which saw the least amount of variation between groups, males were more likely to have a stronger preference for the dominant characteristic in every domain.

Table 14: Relationships between General Population Gender and Thermometer Scores

<i>Thermometer</i>	<i>Gender</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>H</i>	<i>p</i>	<i>eta</i>
Skin-tone	<i>F</i>	41	-0.24	1.16	1.78	0.42	0.20
	<i>M</i>	34	-0.18	0.90			
	<i>Other</i>	7	-0.43	0.53			
Age	<i>F</i>	35	0.06	1.47	1.19	0.55	0.13
	<i>M</i>	37	-0.54	2.84			
	<i>Other</i>	7	-1.29	2.81			
Weight	<i>F</i>	35	-0.43	2.29	0.72	0.70	0.08
	<i>M</i>	39	-0.90	2.31			
	<i>Other</i>	10	-0.30	1.34			
Sexuality	<i>F</i>	39	0.15	1.42	7.06	0.03	0.77
	<i>M</i>	36	-0.56	2.24			
	<i>Other</i>	11	2.09	3.70			
Gender Identity	<i>F</i>	42	-0.38	1.90	14.45	0.00	1.62
	<i>M</i>	30	-0.87	1.98			
	<i>Other</i>	9	2.22	2.73			

3.4.3. Sexuality

A Mann-Whitney U test was conducted to explore the relationship between participant sexuality and self-reported attitude in each of the five domains. Self-reported attitudes in the two areas of sexuality and gender identity were strongly associated with group sexuality ($p < 0.001$), with the “other” (non-straight) group reporting a much stronger preference for gay ($\eta = .405$) and trans people ($\eta = .403$).

Table 15: Relationships between General Population Sexuality and Thermometer Scores

Thermometer	Sexuality	N	Mean	SD	U	p	eta
Skin-tone	Straight	57	-0.16	0.98	679.5	0.68	0.05
	Other	25	-0.40	1.08			
Age	Straight	54	-0.30	0.34	629.5	0.62	0.06
	Other	25	-0.44	0.41			
Weight	Straight	56	-0.96	2.27	961	0.14	0.16
	Other	28	0.00	1.95			
Sexuality	Straight	57	-0.53	1.84	1,195.5	0.00	0.41
	Other	29	1.34	2.61			
Gender Identity	Straight	56	-0.75	2.02	988.5	0.00	0.40
	Other	25	0.80	2.25			

3.4.4. Education

A Mann-Whitney U test was run to establish whether the level of participant education bore any significance on self-reported attitudes. The analyses revealed two areas of significance (see Table 16): Firstly, skin-tone ($p = 0.027$), in which those with a lower level of education expressed greater light-skin preference, although the effect size was small-moderate ($\eta = .246$). Secondly, attitudes towards weight were linked to educational attainment ($p = 0.048$), accounting for approximately 20% of the variance ($\eta = .465$), whereby the lower education group expressed a greater pro-thin bias.

Table 16: Relationship between General Population Education and Thermometer Scores

<i>Thermometer</i>	<i>Education</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>U</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	<i>Higher Ed</i>	61	-0.13	1.07	471.5	0.03	0.25
	<i>Lower Ed</i>	21	-0.52	0.75			
<i>Age</i>	<i>Higher Ed</i>	57	-0.30	2.42	600	0.76	0.03
	<i>Lower Ed</i>	22	-0.45	2.15			
<i>Weight</i>	<i>Higher Ed</i>	62	-0.44	2.30	527.5	0.05	0.46
	<i>Lower Ed</i>	22	-1.17	1.85			
<i>Sexuality</i>	<i>Higher Ed</i>	63	0.05	2.07	637	0.34	0.10
	<i>Lower Ed</i>	23	0.26	2.86			
<i>Gender Identity</i>	<i>Higher Ed</i>	59	-0.36	2.12	691	0.59	0.06
	<i>Lower Ed</i>	22	-0.05	2.44			

3.4.5. Age

A bivariate Spearman's correlation was run to explore whether age was a possible covariate with thermometer score. The results indicated that a significant association existed between participant age and self-reported feelings towards different sexuality groups (with older participants more likely to report a pro-straight bias).

Table 17: Correlation between General Population Age and Thermometer Scores

<i>Thermometer</i>	<i>Age</i>	
	<i>ρ_s</i>	<i>Sig.</i>
<i>Skin-tone</i>	0.07	0.51
<i>Age</i>	-0.05	0.68
<i>Weight</i>	-0.03	0.79
<i>Sexuality</i>	-0.25*	0.02
<i>Gender Identity</i>	-0.09	0.45

*Correlation is significant at the 0.05 level (2-tailed).

3.4.6. Correlations between Thermometer Scores

Correlations between the different thermometer scores were explored for the general population. A Spearman's correlation established that there was a significant relationship between weight D-score and sexuality D-score $r(52) = .374, p = .006$, as well as between gender identity D-score and Age D-score $r(60) = .460, p = .000$. Weaker relationships were found between age- and skin-tone D-scores, weight- and skin-tone D-scores, gender-identity- and skin-tone D-scores, as well as sexuality- and age D-scores (see Table 18).

Table 18: Correlations between General Population Thermometer Scores

Thermometer	1		2		3		4	
	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>	<i>r</i>	<i>Sig.</i>
1 Skin-tone								
2 Age	0.19	0.18						
3 Weight	-0.03	0.80	0.10	0.44				
4 Sexuality	0.30*	0.02	0.19	0.17	0.54**	0.00		
5 Gender Identity	-0.23	0.09	-0.08	0.54	-0.20	0.15	0.58**	0.00

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

3.5. Between-Groups Comparisons

3.5.1. IAT Score

3.5.1.1. *All participants*

A series of one-way ANOVAs was conducted to determine whether IAT scores in each of the five investigated domains differed significantly between Trainee Clinical Psychologists and the general population. Data were normally distributed for each group, as assessed by Shapiro-Wilk's test ($p > .05$). Homogeneity of variance was confirmed by Levene's test ($p > .05$) for four of the IAT categories, but violated in the weight category ($p = .022$). Therefore, a Brown-Forsythe test was used to assess significance.

Results suggested a significant difference between the TCP and GenPop groups in implicit bias toward age and sexuality categories (Table 19). Comparison with Table 5 suggested that TCPs are somewhat less likely than GenPop participants to display an implicit preference for dominant groups in this category (age: $\eta^2 = .276$; sexuality, $\eta^2 = .204$).

Table 19: Between-Group Comparisons of IAT Scores – All Participants

<i>IAT</i>	<i>GenPop</i>	<i>TCP</i>			
	<i>n</i>	<i>n</i>	<i>F</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	82	20	0.16	0.69	0.04
<i>Age</i>	79	19	7.91	0.01	0.27
<i>Weight</i>	84	19	2.67*	0.12	0.20
<i>Sexuality</i>	86	20	0.04	0.04	0.20
<i>Gender Identity</i>	81	19	0.00	0.93	0.01

*Brown-Forsythe test statistic

3.5.1.2. Females aged 35 and under

TCP and GenPop samples differed regarding a number of their demographic characteristics such as the distribution of age, gender, and level of education. To make an analysis of differences between the two groups more meaningful (i.e., less likely to be distorted by characteristics other than this group signifier), a certain portion of both groups were analysed: female participants aged 35 years and below. The age was chosen to achieve more similar means and standard deviations between the groups. These samples comprised a majority of the TCP group ($n = 22$) and 44 members of the GenPop group.

A series of one-way ANOVAs was conducted to determine whether IAT scores in each of the five investigated domains differed significantly between these more comparable trainee and general population groups. Data were normally distributed for each group, as assessed by Shapiro-Wilk's test ($p > .05$). Homogeneity of variance was confirmed by Levene's test ($p > .05$) for four of the IAT categories, but violated in the weight category, thus necessitating a Brown-Forsythe test to assess significance. Results did not show a difference between the two groups in any of the IAT conditions (Table 20). This suggests that the differences observed between TCP and GenPop groups in Table 19 were attributable to participant characteristics such as age and gender that were independent of trainee/non-trainee status.

Table 20: Between Group Comparisons of IAT Scores – Females ≤ 35

IAT	GenPop	TCP			
	N	n	F	p	eta
Skin-tone	24	15	3.71	0.06	0.30
Age	17	14	3.09	0.09	0.31
Weight	18	15	1.09 _{BF}	0.31 _{BF}	0.08
Sexuality	22	15	0.02	0.89	0.02
Gender Identity	23	15	0.03	0.87	0.03

3.5.2. Self-rated Attitudes

3.5.2.1. *All participants*

As self-rated attitude data was not normally distributed, a series of Kruskal-Wallis H tests was conducted to determine whether thermometer scale scores differed significantly between Trainee Clinical Psychologists and the general population in each of the five tested IAT domains. Significance was found in two domains, skin-tone and age (Table 21). Both of these displayed moderate to high effect sizes (skin-tone: $\eta = .334$, $p = .001$; age: $\eta = .327$, $p = .001$), suggesting that TCPs were more likely to report a preference for dark-skin and older people compared to the opposite for the general population.

Table 21: Between Group Comparisons of Thermometer Scores – All Participants

<i>IAT</i>	<i>GenPop</i>	<i>TCP</i>			
	<i>n</i>	<i>n</i>	<i>H</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	82	20	11.26	0.00	0.33
<i>Age</i>	79	19	10.39	0.00	0.33
<i>Weight</i>	85	19	1.05	0.306	0.10
<i>Sexuality</i>	86	20	0.96	0.33	0.10
<i>Gender Identity</i>	81	19	0.341	0.56	0.06

3.5.2.2. Females aged 35 and under

As with IAT scores, groups were filtered to exclude males and other genders, and age limited to 35 and below. An analysis between these more demographically similar groups suggested that the identified differences in the domains of skin-tone and age remained significant and could thus be more confidently attributed to trainee/non-trainee status (Table 22). This indicated that trainees were more likely to report a greater pro- dark skin and pro-old bias than the general population.

Table 22: Between Group Comparisons of Thermometer Scores – Females ≤ 35

<i>IAT</i>	<i>GenPop</i>	<i>TCP</i>			
	<i>n</i>	<i>n</i>	<i>H</i>	<i>p</i>	<i>eta</i>
<i>Skin-tone</i>	24	15	5.99	0.01	0.40
<i>Age</i>	17	14	4.40	0.04	0.38
<i>Weight</i>	18	15	0.19	0.19	0.23
<i>Sexuality</i>	22	15	0.21	0.65	0.08
<i>Gender Identity</i>	23	15	0.58	0.45	0.13

3.6. Between-Measure Comparisons

The correlation between IAT D-scores and their respective thermometer scores was explored to establish whether the weak, yet positive correlation between the two predicted by the literature was present. A Spearman's correlation revealed the same direction of correlation between the scores for both groups (e.g., self-reported pro-cis bias cooccurring with implicit pro-cis bias) except in the skin-tone category amongst trainees. The highest rates of correlation were found in the sexuality condition (see Table 23). Between the two groups, the strongest correlation observed was between the sexuality measures in the general population ($p < 0.001$) with a correlation coefficient of $\rho = .401$. The correlation between sexuality measures approached significance amongst trainees ($p = .054$, $\rho = .437$).

Table 23: Correlations between IAT Score and Thermometer Score

IAT D-Score	Group	Thermometer Score	
		ρ_s	p
Skin-tone	GenPop	0.14	0.20
	TCP	-0.01	0.96
Age	GenPop	0.19	0.09
	TCP	0.12	0.62
Weight	GenPop	0.14	0.19
	TCP	0.12	0.62
Sexuality	GenPop	0.40**	0.00
	TCP	0.44	0.05
Gender Identity	GenPop	0.24*	0.03
	TCP	0.06	0.81

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

4. DISCUSSION

4.1. Summary of Results

This study aimed to compare the performance of a group of Trainee Clinical Psychologists with a sample of the general population on measures of implicit bias. Biases were investigated in the areas of skin-tone, age, weight, sexuality and gender identity. The main findings were:

- General population (GenPop) and Trainee Clinical Psychologist (TCP) groups showed implicit bias against dark-skinned people
- The GenPop group also showed implicit biases against old people and overweight people
- The TCP group showed a slight pro-gay bias
- Neither group displayed a bias regarding trans- or cisgender people
- Participant gender and sexuality were strong predictors of IAT score in their respective IAT categories
- Between-group differences diminished when demographically similar samples (females aged 35 and below) were compared

4.2. Relationship with previous Research

4.2.1. Implicit Bias in the General Population

UK general population IAT D-scores from this study were compared to those from Project Implicit for the last five years available (2012-2016). Of the four comparable domains (skin-tone, age, weight, sexuality), all except sexuality showed the same direction of bias against the marginalised group. Levels of bias in the weight category were somewhat lower in this study ($d = -0.23$) versus Project Implicit scores ($d = -0.45$). This may be explained by the distorted features of the latter's stimuli exacerbating negative responses. Meanwhile the more realistic stimuli used for the skin-tone condition in this study saw a slightly increased level of bias at $d = -0.42$ versus Project Implicit's $d = -0.32$.

Sexuality IAT scores yielded no bias in the GenPop group. However, as previously noted, the recruited sample featured a considerably higher proportion of non-straight participants: the mean score for straight participants showed a pro-straight bias equal to that captured by Project Implicit ($d = -0.2$). This suggests that the use of carefully selected photographs can produce similar results to the more common word and symbol IAT stimuli used in this condition.

4.2.2. Gender Identity IAT

The newly developed Gender Identity category displayed characteristics that support its validity. When the sample was differentiated by cisgender and other (trans-, non-binary-, other) gender, cisgender participants showed a slight bias against transgender people ($d = -0.14$). Those identifying as trans, non-binary or other, however, displayed a moderate to strong pro-trans bias ($d = 0.42$). The significant relationship between lower education and pro-trans bias may be attributed to the fact that transgender, non-binary and other participants were more likely to have educational qualifications below the tertiary level, whereas cisgender participants were more likely to have a university qualification. The trainee group, who only featured cisgender participants, performed similarly on the task to the general population.

This study's Transgender IAT showed a different score profile to the Transmen and Transwomen IATs developed by Wang-Jones et al. (2017). In terms of convergent and discriminant validity, this study showed trans and cis groups could be differentiated by their respective moderate-strong pro-trans and slight pro-cis bias. This stands in contrast to Wang-Jones' findings of a smaller pro-trans bias amongst trans people and larger pro-cis bias amongst cis people.

This study also showed greater bias against trans people from cis males than females, which is consistent with both the literature on attitudes towards trans people (e.g., Warriner, Nagoshi, & Nagoshi, 2013) as well as general findings on implicit bias (e.g., Nosek & Smyth, 2007). The reason for these differences is unclear, yet the idiosyncrasies of these IATs should be noted. Chiefly among these are the choice of words, i.e., cisgender/transgender as opposed to

biological/transsexual, and the different sample (UK versus US). It is therefore possible that different cultural attitudes towards transgender people, as well as the associations elicited by certain words, contributed to the observed differences in IAT scores.

4.2.3. Implicit Bias amongst Trainee Clinical Psychologists

4.2.3.1. *Skin-tone*

As with the broader literature on implicit bias, much of the research into psychologists' and other healthcare professionals' biases has focused on "race" or ethnicity. This study suggests that the area continues to warrant further interest, as the Skin-tone IAT showed the highest level of bias amongst psychologists ($d = -0.45$). IAT D-scores in this category were comparable to "Race" IAT results reported for trainee and qualified councillors and psychologists in US studies (e.g. Castillo., Brossart, Reyes, Conoley, & Phoummarath, 2007: $d = -0.44$; Boysen & Vogel, 2008: $d = -0.32$) and stronger than in Blencowe's 2017 study ($d = -0.27$) which investigated a similar sample using different stimuli.

TCPs' Skin-tone IAT score was most similar to that of the GenPop group amongst all five investigated IATs (once gender was accounted for with the Gender Identity IAT). The other IATs showed lower levels of TCP bias as well as lower self-reported bias. The skin-tone category also saw the highest discrepancy between self-reported attitudes and implicit bias. TCPs reported an overall dark-skin preference with a thermometer rating of 0.55 higher than light-skin. This suggests that negative associations with darker skin colour are a particular blind-spot for trainees, or that self-presentation concerns were a significant factor. This negative direction of correlation replicates that found by Blencowe (2017). These results thus support the case for incorporating opportunities throughout training in which issues such as "race" and ethnicity, and their impact on clinical practice, can be explored.

4.2.3.2. Sexuality

Contrary to previous findings (e.g., Boysen & Vogel, 2008; Blencowe, 2017), TCPs showed a slight pro-gay, rather than pro-straight bias. As noted, part of this effect can be attributed to the higher percentage of non-straight trainees in the sample, who exhibited a strong pro-gay bias. However, straight trainees averaged a D-score of $d = 0.09$ which is close to the level classified as a preference for gay people. At least two phenomena can be drawn on to help explain this finding:

Firstly, *intergroup contact theory* (Allport, 1954) asserts that increased contact between groups under optimal conditions can reduce prejudice. Allport specified the four features of optimal conditions as equal status between groups, intergroup cooperation, common goals, and the support of authorities or custom. A large body of work conducted over the subsequent half century has confirmed many of the principles Allport set out and expanded them from the study of interethnic relations to areas such as sexuality (e.g., Lance, 2002). As most of the TCP group were recruited from the same cohort (to which the researcher belongs), it can be confidently asserted that the above conditions were regularly achieved for most of the trainee participants. Members of the cohort, as well as a number of teaching staff, openly identified as gay, lesbian or queer; and discussion and reflection on trainees' position towards their own and others' sexuality was encouraged throughout training.

Secondly, Westgate, Riskind, and Nosek (2015) noted how implicit bias towards sexual minorities has changed significantly on a population level in a short space of time. Analysing the data from over 600,000 participants (83.2% US residents) from Project Implicit, they found that implicit bias had dropped 13.4% between 2006 and 2013. In keeping with the trends identified in UK survey data (e.g., NatCen, 2017), the authors also found explicitly reported bias to have decreased at an even higher rate (26%) over this time. This suggests a wider social change that may be carried by factors such as greater public visibility and inclusive legislation. Although the trainee sample in this study is too small to suggest generalisable conclusions from, the results indicate a possible

connection between the content and composition of the cohort and implicitly held associations with sexuality.

4.2.3.3. Weight

Contrary to previous findings (e.g., Jackson, 2015; Blencowe, 2017), TCPs did not show a significant bias against weight/ body shape. It is particularly surprising that results analogous to those of the general population were not found, as trainees also self-reported a preference for thinness. As the strength of the general population's implicit pro-thin bias was lower than that found by previous studies (despite a strong self-reported thin preference), it is possible that the stimuli employed in this study (silhouettes) evoked weaker negative associations than faces. This does not take away from the potential advantages of the silhouette stimuli which are not subject to the distorting effects of the face stimuli.

Despite Swift et al. (2013) identifying weight as one of few realms where explicit bias is deemed socially acceptable, it should be questioned to what extent this is the case and if so, whether it is likely to change. In recent years terms such as "fat-shaming", as well as a growing "body positivity" movement (Sastre, 2014) have sought to challenge previously accepted evaluations of body types. It is therefore arguable that this area might be undergoing a shift in explicit and implicit attitudes similar to that seen in domains such as sexuality.

4.2.3.4. Age

The age category showed the highest level of explicit preference from the trainee group, with warmth felt towards old people exceeding that felt towards young people by more than one point on the thermometer scale. With no known research on psychologists' implicit bias toward the elderly beyond Blencowe's (2017) finding of mild-moderate pro-young bias, it is difficult to interpret the results based on a small sample. Trainee participants will have experienced working therapeutically with older people and as such established increased contact with this group, as this is a required component of the course. Furthermore, teaching will have involved significant consideration of the ways the elderly can be discriminated against, as well as regular reflection on

trainees' own practice in this regard. Reviews of studies examining attitudes towards older adults held by physicians (Meisner, 2012) and nurses (Liu, Norman, & While, 2015) have reported mixed findings, suggesting the complexity of HCP bias towards the elderly. For any definitive conclusions to be drawn, these findings would thus have to be replicated with a larger sample.

4.3. Implications

4.3.1. IAT Research

This study demonstrated the importance of considering the constituent elements of measures such as the IAT. Critically evaluating the quality and validity of components such as the stimuli can increase researchers' confidence in test materials before progressing to more advanced experimental stages, such as studies exploring the predictive validity of IAT score on observable bias. In highlighting the value of revisiting the building blocks of the various IATs, this study answered Wentura and Rothermund's (2007) appeal for "more basic research" to be conducted on the IAT to better understand its fundamental qualities.

The study also addressed important theoretical, practical and ethical considerations to take into account when creating a new IAT such as the Gender Identity IAT. This IAT, whose characteristics look promising based on initial results, can serve as a template for future research on implicit bias against transgender people. The newly developed stimuli for all IATs will be made available to researchers and can be used as an alternative to those in Project Implicit.

4.3.2. Training

Though research on UK TCPs' implicit biases remains nascent, further replication with larger samples may increase understanding of the areas in which trainees are more likely to exhibit bias. Despite it being premature to suggest what the relationship between these scores and observable biased behaviour is, the existing literature does suggest it could impact interpersonal interactions and clinical practice. In line with the BPS' (2018) recommendations

of raising awareness of factors that may affect psychologists' behaviour, it is therefore arguable that trainees' attention should be drawn towards these findings as part of their clinical training. This could easily be incorporated into pre-existing teaching and reflection dealing with difference and discrimination.

As clinical psychology training differs from other allied professions (e.g., psychiatry; Kingsbury, 1987) in regard to the importance placed on reflective practice, it would seem important to highlight the biases trainees are susceptible to, lest it be assumed that effects seen in the general population do not apply to them. Despite large meta-analyses being conducted, not enough is yet known about a) the relationship between implicit bias and behaviour (Oswald et al., 2013) or b) the mechanisms by which implicit bias scores are meaningfully reduced (Forscher et al., 2018). Nonetheless, emerging research on the responses of participants to IAT result feedback (e.g., Howell & Ratliff, 2017) suggests that raising awareness in a sensitive way is less likely to elicit defensiveness and more likely to lead to thoughtful engagement with the discrepancy.

4.3.3. Service Provision

Tishelman et al. (2015) document the recent increase in trans- and gender identity-related issues that clinical psychologists are encountering in their practice, and the associated clinical challenges. Services that specialise in supporting those who are considering undergoing transition have seen huge increases in referrals coupled with an increasingly complex client profile (Holt, Skagerberg, & Dunsford, 2016). This has resulted in many (especially younger) people being referred back to local psychological services before being able to access gender identity services. As TCPs will be entering a work environment in which this client group is more visible than before, it is important that they consider how their attitudes may affect their work with non-cisgender clients.

The study's findings of pro-cis trainee bias is supported by the literature on trans people's perception of interactions with healthcare professionals, which is often characterised by perceived insensitivity. The replication of other findings such as greater light-skin bias can inform the debate on health disparities

amongst ethnic minorities. It should be noted that skin-tone is only one of several factors implicated in observed differences (including, e.g., ethnicity, culture, language, religion) but its potential impact should not be neglected.

At a time when trainees are increasingly asked to demonstrate leadership skills during training (BPS, 2010), it is especially worth considering the areas beyond the clinician-client interaction in which their biases could have an impact. The NHS embodies diversity not just in terms of service users, but also those it employs (including an increasing number openly identifying as trans; Davis, 2009). The possible ramifications of bias operating on an organisational level should therefore be considered, including areas such as recruitment, promotion and resource allocation. This could bear particular relevance to the issue of diversity within clinical psychology (DCP, 2015), and how a demographically homogenous profession may be unwittingly perpetuating stereotypes and biases in applicant selection.

4.4. Critical Evaluation

4.4.1. Strengths

This study is, to the author's knowledge, only the second to explore implicit bias amongst UK Trainee Clinical Psychologists. By revisiting Blencowe's (2017) study and employing a similar methodology whilst addressing some of the identified limitations, this study was able to extend and replicate previous findings. This was aided by having a larger sample of participants from the general population. Furthermore, this study is believed to be the first to investigate implicit transgender associations in the UK.

By taking a critical position, the study highlighted the need to attend to cultural differences (e.g., choice of words; representativeness of stimuli) when considering the IATs application. By developing new sets of stimuli across different categories, potential confounds could be better controlled for. The methods used to create the skin-tone and age IATs would not have been available to the IATs developers at time of its inception and suggest that

technological developments should continually be exploited to improve the quality of such measures.

4.4.2. Limitations

4.4.2.1. *Sample*

As previously noted, the fact that this was an online study that relied on access to a suitable device will have excluded some people from participating.

Furthermore, the sample was self-selecting and not random. Although an effort was made to publicise the study as widely as possible, most participants were either connected to the researcher via personal or professional networks, or were members of online communities in which the study was advertised.

Even though the proportion of white to non-white participants approximated national estimates, a greater ethnic diversity of participants would be required as part of a larger overall sample size for meaningful group comparisons to be made. Despite the proportion of male trainees in this sample approximating national figures, greater numbers would have to be recruited to allow for gender-based comparisons. This would be especially informative to establish whether the greater levels of implicit bias observed in males in the general population and explicit bias observed in male HCPs (Brown et al., 2017) translate to greater levels of bias amongst male psychologists compared to their female colleagues.

The characteristics of the TCP group in particular necessitate a caveat regarding the interpretation of the findings. As indicated, the limited sample size constrains the confidence with which their results can be thought to be representative of the UK trainee population. Furthermore, as the majority of trainees participating in this study were part of the same year cohort at a London university, there may be factors relating to the specific course and geographical location which limit the degree to which the results can be extrapolated to other UK TCPs.

4.4.2.2. Language and Stimuli

Feedback received during the piloting stage of the gender identity IAT suggested that some participants might have been unfamiliar with the prefix “cis” used to denote the opposite of “trans”. Although the meaning of cisgender was understood when presented in the context of transgender-related words, it might not have represented a meaningful self-identifier for some (cisgender) participants. This may explain smaller effect sizes if the test did not tap into in- and out-group mechanisms to the same degree as other categories. This was a known constraint in the creation of the test which was considered unavoidable due to the limited available terminology.

Steffens et al. (2008) advised against using concept negations (e.g., “non-trans”) as this is bound to lead to activation of the opposite concept (e.g., “trans”), in addition to the prefix itself embodying a “negative”, linguistically speaking. It is possible that despite the avoidance of this negation, the “trans” concept was nonetheless activated in participants who required it to decode the meaning of “cis”. The term “cisgender” was only added to the Oxford English Dictionary as recently as 2015, although it was used in academic and activist circles for at least the preceding two decades (Schwiegershausen, 2015). Based on the increasing use of the term in public discourse, it is plausible that it will in time become more familiar as a descriptor in its own right, and thus improve the accuracy of future research.

Serano (2013) likens this shift to that observed since the 1960s with the terms “heterosexual” and “straight” finding increasing use. Whereas the dominant sexual orientation is considered “normal” and “taken for granted” by its omission, its categorisation acts to “decentralise” the dominant group, exposing the distinction as merely one alternative rather than the norm against which all others are defined. Until the use of “cisgender” achieves more widespread recognition, it would be beneficial for researchers to control for whether the participant is familiar with the term before continuing. This in itself could further inform understanding of the IAT effect by comparing results of those who know the term with those for whom it is novel.

The changing nature of language also requires consideration when attending to the word-stimuli used: One participant fed back that the word “sickening” had acquired positive connotations in drag culture and the gay community, so that its inclusion in the sexuality IAT could be problematic. Including a larger and more diverse group of people in the piloting stages would hopefully address such issues.

4.4.2.3. Categorisation

Merging trans males and -females with non-binary participants into one category allowed for a large enough gender comparison group, which was an important part of the Gender Identity IAT validation process. Although the results confirm the hypothesis that these participants have some degree of shared experience and identity which translates to cis/trans bias scores, it is not clear how meaningful it is to maintain this distinction in relation to other IATs. Further research with larger trans samples would do well to explore whether trans participants represent a distinct group in regard to their performance on other measures of bias, or whether they should best be grouped together with male and female categories.

4.4.2.4. Other methodological issues

Internet-based research can be greatly beneficial to researchers in that it allows for wider recruitment irrespective of geographical location and allows participants to complete the study at a time and place of their choosing (Barak, Buchanan, Kraus, Zack, & Stricker, 2004). However, this method also entails inherent challenges: Chief among these are the lack of a controlled environment in which the test is taken. Factors that have been shown to influence IAT effects, such as antecedents to the test or distractions during its administration (e.g., Teige-Mocigemba et al., 2010), could therefore not be controlled for. Hoerger (2010) also notes higher dropout rates in online research compared to studies with an experimenter present. This can be attributed to several factors including the sense of commitment made to participating, anonymity, and other distractors. Online participants are also less likely to email the researcher to ask for clarification as opposed to directly asking when in the same room, making abandonment of the task more likely. The design of this study did not allow for

participants to be retested at a later time, and so cannot comment on the test-retest reliability of these measures.

This study randomised the presentation of IATs to ensure an even distribution of tests taken across categories. This decision was based on the data from Project Implicit showing some categories to be very popular, with others receiving a fraction of the participants. However, it is possible that this strategy led to a greater dropout rate if participants were not presented with the IAT they were interested in taking. While a strength of this study was in demonstrating improvements that could be made across different IATs, subsequent studies may achieve greater engagement by focusing on one area.

4.5. Recommendations for Future Research

4.5.1. Samples

The newly developed Gender Identity IAT requires further exploration of its characteristics. A larger non-cisgender sample would allow comparisons between male and female trans people, non-binary people and other sexual minorities, instead of grouping them together as in this study. The other IATs developed for this study would also benefit from replication with a larger sample. Especially the Skin-tone IAT, which showed the highest bias scores, would benefit from a large enough non-white sample to allow exploration of hypothesised between-groups differences.

4.5.2. Mechanisms for Change

Future studies could test hypotheses about what factors may be driving bias, beyond establishing associations between demographic characteristics and bias. For instance, this study confirms previous findings of greater male bias, but what is it about being male that is likely to result in greater bias? Studies such as Burke et al.'s (2015), which examined the mitigating effects of contact and empathy against medical students' sexuality bias are therefore to be encouraged: They offer possible areas for intervention, rather than simply identifying that a group with an unchangeable demographic profile exhibits greater bias.

Although this study looked at differences between groups, research into similarities, e.g., factors that affect all IAT scores, are vital. Especially the link between cognitive demands participants are placed under and IAT score (Cai et al., 2004) is pertinent for health workers in stressful environments.

4.5.3. Stimuli

Despite successful initial validation (in-/out-group, convergent, divergent) of the Gender Identity IAT developed for this study, it cannot be confidently stated to what degree the different types of stimuli contributed to the observed IAT effect. As both symbol and word stimuli were employed, it is possible that the results are more strongly predicted by one type of stimulus than another. Based on Foroni and Bel-Bahar's (2010) comparison of picture- and word-IATs, it can be hypothesised that the different types of stimuli are processed in two different ways. As the symbols representing gender transition require the decoding of a temporal element (before→after), it is possible that its processing will take longer and thus affect the IAT D-score. A comparison of performance on word-symbol and word-only versions of this IAT may indicate refinements that would enhance its validity.

4.5.4. Predictive Validity

As the ultimate goal of this research is to identify and counteract real-world biased behaviour, real-world measurable outcomes must be identified with which IAT scores can be compared in order to explore their predictive ability. This should be attempted once further replication confirms the psychometric properties of the developed measures (see above). Meaningful metrics relating to psychologists' bias could be on an individual level (e.g., the *Session Rating Scale*, wherein clients rate the quality of the therapeutic alliance; Duncan et al., 2003) or on a service level (e.g., referral rates, outcomes).

4.5.5. Non-binary Alternatives

Finally, it is worth drawing to attention that the IAT is reliant on a binary distinction within a category group. Though undoubtedly useful in illuminating many associations held by different population groups, alternative measures

which explore non-binary attitudes should not be neglected. This is especially true of areas such as gender and sexuality which have witnessed a dramatic rise in those who no longer frame their identities in static or binary terms (Erby et al., 2016). Similar considerations apply to areas such as ethnicity, where increasingly varied mixed ethnicities are challenging the continued relevance of the Black/White dichotomy that has dominated much of the IAT research (Chisolm-Straker & Straker, 2017).

The recent development of other paradigms which appear to tap into automatic processing, such as making speeded judgments of the grammatical accuracy of statements (Gilead, Sela, & Maril, 2018) point to opportunities for implicit bias research beyond binary distinctions, which could compliment research on the IAT. Although this study has focused on developing the IAT, it is important that this continues alongside the development of other measures, as different measurement tools rely on different processes for the assessment of similar constructs (Gawronski & De Houwer, 2014). This variety in approaches should help ensure that validation of the construct of implicit bias is not constrained by the idiosyncrasies of one specific tool.

4.6. Conclusion

In conclusion, the revised IATs developed in this study indicated similar levels of bias in the general population to those reported by previous studies. The newly created Gender Identity IAT suggested a pro-cisgender bias amongst cisgender participants and a pro-transgender bias amongst non-cisgender participants. These initial results tentatively point to the validity of these measures.

Trainee Clinical Psychologists displayed lower levels of bias in most domains by a greater degree than indicated by the literature. However, this difference diminished to insignificance when the TCP group were compared to an age- and gender-matched sample of the GenPop group. Self-reported attitudes were in keeping with previous findings, with TCPs more likely to profess egalitarian views. This meant that some of the largest discrepancies between implicit and explicit bias were found amongst the TCP group.

Replication of these findings may have implications for clinical training. Raising trainees' awareness of the discrepancies that are likely to occur between implicit and explicit bias can inform pre-existing teaching and enhance reflective practice. The findings also have potential implications for clinical practice and service provision. Particularly the domains of gender identity, skin colour and weight are indicated by the results as areas in which the impact of clinician bias warrants further consideration. An important part of future research should involve exploring the link between measures of implicit bias and measurable real-world bias that relates to psychological practice. The generalisability of these findings should be viewed with caution in light of the limited size and diversity of the samples, as well as the binary nature of the IAT which may not capture more nuanced associations.

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APPENDICES

Appendix A: Application for Research Ethics Approval

UNIVERSITY OF EAST LONDON

School of Psychology

APPLICATION FOR RESEARCH ETHICS APPROVAL

FOR RESEARCH INVOLVING HUMAN PARTICIPANTS

FOR BSc RESEARCH

FOR MSc/MA RESEARCH

**FOR PROFESSIONAL DOCTORATE RESEARCH IN CLINICAL,
COUNSELLING & EDUCATIONAL PSYCHOLOGY**

Your details

1. Your name:

Nicholas Hearn

2. Your supervisor's name:

Dr Matthew Jones Chesters

3. Title of your programme: (e.g. BSc Psychology)

Professional Doctorate in Clinical Psychology

4. Title of your proposed research: (This can be a working title)

Implicit Bias Amongst Trainee Clinical Psychologists in the UK

5. Submission date for your BSc/MSc/MA research:

May 2018

- 6. Please tick if your application includes a copy of a DBS certificate**

☐

- 7. Please tick if you need to submit a DBS certificate with this application but have emailed a copy to Dr Mary Spiller for confidentiality reasons (Chair of the School Research Ethics Committee) (m.i.spiller@uel.ac.uk)**

☐

- 8. Please tick to confirm that you have read and understood the British Psychological Society's Code of Human Research Ethics (2014) and the UEL Code of Practice for Research Ethics (See links on page 1)**

☒

About the research

9. The aim(s) of your research:

Negative bias towards certain demographic groups (e.g. minority ethnic groups, transgender people) may contribute to persistent disparities observed in society. Although explicit negative attitudes towards many groups has fallen over the last decades, there is evidence to suggest that many people nevertheless continue to harbour implicit biases that appear to favour certain groups.

The aim of this study is to measure and evaluate potential implicit biases of UK trainee psychologists with respect to skin-tone, weight, sex, sexuality and transgender. This study will involve the creation of new stimuli for the various categories in an effort to enhance their ecological validity and applicability to a UK population. Preliminary norms will be derived based on the general population, against which the trainee psychologists will be compared. The findings from this research may help raise awareness of implicit bias and the implications for societal cohesion, as well as clinical psychology practice.

- 10. Likely duration of the data collection from intended starting to finishing date:**
December 2017 to May 2018 (6 months)

Methods

11. Design of the research:

The study will use a quantitative, quasi-experimental between groups design. An online questionnaire will be used to gather demographic information and explicit attitudes, and an online test to measure implicit bias will commence. Participants' scores for each measure of implicit and explicit attitudes towards skin-tone, weight, sex, sexuality and transgender are the dependent variables. The independent variable is participant type (trainee psychologist and general population). A correlational design will be employed to explore the relationship between implicit and explicit measures of bias.

12. The sample/participants:

For the preliminary UK population norms, working age adults from the general population will be recruited. These will be divided into the following five age groups: 18-29, 30-39, 40-49, 50-59, 60-69. From each age group, the study aims to recruit 50 male and 50 female participants (n=100 per group, n=500 in total). A convenience sample of 50 clinical psychology trainees will be recruited to the comparison group.

Participants will be recruited online via social media and email. The researcher will post information about the study in UK clinical psychology forums and contact trainee psychologists via email to inform them of the study and the possibility of participating. Members of the general public will also be recruited on social media sites such as Facebook. The web link to the study will be disseminated to target participants via these online communities. Furthermore, key figures in these communities (forum administrators) will be contacted prior to dissemination, to gain the required permission to post the study's web link to the measures.

Participants are required to be aged 18 over, resident in the United Kingdom and sufficiently proficient in the English language to understand the task instructions. Confirmation of age and country of residence is required before proceeding with the study, and participants will not be able to continue if their selection does not meet these inclusion criteria.

13. Measures, materials or equipment:

Implicit Bias

The Implicit Associations Test (IAT, Greenwald, McGhee, & Schwartz, 1998) will be used in this study. The IAT measures the relative strength of associations between pairs within a category (e.g. darker vs. lighter skin-tone) and attribute concepts. Items within a category can be represented verbally or pictorially. The IAT aims to capture the difference in attitude held towards the pairs, by presenting them alongside a value-label, such as good/bad or pleasant/unpleasant in varying constellations.

New stimuli will be developed for the categories used in order to address previously

identified limitations and to make them more relevant to a UK population. Image modification software will be used to generate new standardised sets. The study will draw on some of the word items used by Harvard University's *Project Implicit* (see Appendix 4; adapted from Nosek and Smyth, 2007).

Explicit Bias

Self-reported attitudes towards each of the target pairs (e.g. straight people vs gay/lesbian people) will be measured using two 9-point semantic differentials as described in Nosek and Smyth (2007 – see Appendix 4). E.g. participants will be asked to rate how warm or cold they feel towards straight people and then how warm or cold they feel towards gay/lesbian people.

14. If you are using copyrighted/pre-validated questionnaires, tests or other stimuli that you have not written or made yourself, are these questionnaires and tests suitable for the age group of your participants?

YES

15. Outline the data collection procedure involved in your research:

(Describe what will be involved in data collection. For example, what will participants be asked to do, where, and for how long?)

This is an online study. For recruitment on social media, relevant administrators of each online community will be contacted to gain the required permission to collect research data. Each site's respective policy on research will be researched in this respect. The web link to the study will then be posted in relevant online communities (those used by trainee psychologists, and of groups that may have an interest in the types of attribution being investigated). From there, individuals will be able to access information relating to the aims and procedures of the study. Participants will be asked to read the study information, following which they will be asked to provide limited demographic information about themselves.

Participants will be asked to participate in 5 separate implicit association tests, on the categories of skin-tone, weight, sex, sexuality, and transgender. Explicit attitudes towards each of the target categories will be measured initially, following which the main part of the IAT will commence. The procedure is intended to closely replicate that used in the proprietary virtual laboratory developed and operated by the team Project Implicit at Harvard University.

The IAT requires participants to rapidly classify stimuli (in the form of words, symbols or images) that represent a category and attribute into one of four distinct categories with only two responses. Choices will be made by pressing one of two buttons on a computer keyboard. The total time anticipated to complete the tests is 10-35 minutes, depending on how many tests are chosen. Participants will be provided with feedback on their performance and debriefed at the end of each IAT they complete. In addition,

participants will be invited to provide their email addresses if they wish to be entered into a prize draw to win £20 worth of Amazon vouchers in recognition of their contribution to the study.

Ethical considerations

Please describe how each of the ethical considerations below will be addressed:

16. Fully informing participants about the research (and parents/guardians if necessary):

Participants will be presented with an information sheet (Appendix 1) on the first page of the website. This digital letter will give a detailed outline of the aims and methodology involved in the study. The participant will be asked to confirm they have read this before continuing. Information regarding the right to withdraw without providing a reason will be included. Participants are informed that they might find the feedback they receive challenging, and will be directed towards sources support when presented with the results.

The information provided will be in accessible, easily understandable lay terms. The style is suited for adults as the study is not intended for those under the age of 18 and those under this age will not be eligible for inclusion.

17. Obtaining fully informed consent from participants (and from parents/guardians if necessary):

Participants will be directed to an online consent form and required to confirm their consent to proceed with the study. The study will use an informed consent measure tailored towards an online study. The form will be broken down into statements with a check box next to each statement. This measure of informed consent measure will only be applicable to those aged 18 and over and thus written in a style suited to adults. Furthermore, the right to withdraw at any time (before, during and after) will be clearly stated on the consent form, invitation letter. Failure to tick all boxes to indicate informed consent will prevent the participant from continuing with the online survey and subsequently taken to the debrief form.

18. Engaging in deception, if relevant:

There will be no deception involved in the information provided about the study.

19. Right of withdrawal:

(In this section, and in your participant invitation letter, make it clear to participants that 'withdrawal' will involve deciding not to participate in your research and the opportunity to have the data they have supplied destroyed on request. This can be up to a specified time, i.e. not after you have begun your analysis. Speak to your supervisor if necessary.)

The participant's right to withdraw from the study at any time will be stated in the participant information sheet (attached). Participants will have the option to close the browser before the end of a test to prevent their data being included in the analysis. Completed tests can be removed from the analysis by April 2018 by contacting the researcher via email (provided on the invitation page) and stating their automatically generated unique identifier number.

20. Anonymity & confidentiality: (Please answer the following questions)

20.1. Will the data be gathered anonymously?

(i.e. this is where you will not know the names and contact details of your participants? In qualitative research, data is usually not collected anonymously because you will know the names and contact details of your participants)

YES

Participants will be allocated a unique identifying number to collate their results in the study database. No identifying information will be collected when obtaining consent or as part of the research tasks. The data stored on cookies on participants' computers will not contain any study results or reaction time data. Cookies will solely be used to store study progress information to minimize the possibility of participants completing the study more than once and to ensure participants who complete the study over more than one session do not complete the same task twice. Email addresses or phone numbers will be collected from participants who wish to be entered into the prize draw. This data may contain potentially identifying information therefore it will be stored entirely separately from the research data and will not be linked to participant's study ID number.

21. If NO what steps will be taken to ensure confidentiality and protect the identity of participants?

N/A

22. Protection of participants:

Every reasonable effort will be made during all stages of the study to ensure that the gathered data remains secure. Secure servers will be used, and the data will be stored on an encrypted external hard drive which the researcher will keep physically secure. The identity of participants will be anonymised and not known to the researcher. No information of any kind relating to an individual participant will be published in an aim to protect the online privacy of the individual.

Participants will be informed that they might find the feedback they receive challenging, and will be directed towards sources support when presented with the results. These will be external organisations, as well as the researcher and supervisor's contact details, should they wish to receive further information about the study.

23. Protection of the researcher:

The researcher will not be exposed to any obvious health and safety risks, as the study will be conducted purely electronically via the internet. In the event that any risk should become apparent, the academic supervisor will be consulted.

24. Debriefing participants:

Participants are not misled about the aims and nature of the study. Following their participation, the web page will immediately present them with their results and further information placing these results into context (see Appendix 3 for example). Participants will be directed towards sources of support, should they need them, when presented with the results. These will be external organisations, as well as the researcher and supervisor's contact details, should they wish to receive further information about the study.

The results/debrief page will thank participants for their participation and remind them what will happen with their data, as well as their right to have their data removed from the study and destroyed. Participants will be reminded of the anonymity of their data.

25. Will participants be paid?

NO

Participants will be invited to enter into a prize draw for a £20 Amazon voucher. To do this, they will be asked to provide an email address or phone number which will be store separately from the anonymously collected data. Offering an incentive of this nature is common to online research, and is aimed to be a recognition of the participants' times, as well as an incentive to complete the tests.

26. Other:

(Is there anything else the reviewer of this application needs to know to make a properly informed assessment?)

NO

Other permissions and ethical clearances

27. Is permission required from an external institution/organisation

NO

(e.g. a school, charity, local authority)?

28. Is ethical clearance required from any other ethics committee?

NO

29. Will your research involve working with children or vulnerable adults?*

NO

30. Will you be collecting data overseas?

NO

5. Signatures

TYPED NAMES ARE ACCEPTED AS SIGNATURES

Declaration by student:

I confirm that I have discussed the ethics and feasibility of this research proposal with my supervisor.

Student's name: Nicholas Hearn

Student's number: u1525461

Date: 19/12/17

Declaration by supervisor:

I confirm that, in my opinion, the proposed study constitutes a suitable test of the research question and is both feasible and ethical.

Supervisor's name: Matthew Jones Chesters

Date: 19/12/17

Appendix B: Ethics Review Decision Letter

School of Psychology Research Ethics Committee

NOTICE OF ETHICS REVIEW DECISION

For research involving human participants

BSc/MSc/MA/Professional Doctorates in Clinical, Counselling and Educational Psychology

REVIEWER: Tim Lomas

SUPERVISOR: [REDACTED]

STUDENT: Nicholas Hearn

Course: Professional Doctorate in Clinical Psychology

Title of proposed study: Implicit Bias Amongst Trainee Clinical Psychologists in the UK

DECISION OPTIONS:

1. **APPROVED:** Ethics approval for the above named research study has been granted from the date of approval (see end of this notice) to the date it is submitted for assessment/examination.
2. **APPROVED, BUT MINOR AMENDMENTS ARE REQUIRED BEFORE THE RESEARCH COMMENCES** (see Minor Amendments box below): In this circumstance, re-submission of an ethics application is not required but the student must confirm with their supervisor that all minor amendments have been made before the research commences. Students are to do this by filling in the confirmation box below when all amendments have been attended to and emailing a copy of this decision notice to her/his supervisor for their records. The supervisor will then forward the student's confirmation to the School for its records.
3. **NOT APPROVED, MAJOR AMENDMENTS AND RE-SUBMISSION REQUIRED** (see Major Amendments box below): In this circumstance, a revised ethics application must be submitted and approved before any research takes place. The revised application will be reviewed by the same reviewer. If in doubt, students should ask their supervisor for support in revising their ethics application.

DECISION ON THE ABOVE-NAMED PROPOSED RESEARCH STUDY

(Please indicate the decision according to one of the 3 options above)

Minor amendments

Minor amendments required (for reviewer):

- You state that, prior to sending out invitation/information letters to potential participants, you will 'post information' about the study on various forums. Please provide an example of the kind of posting you will do in the appendices.

- I'm wondering if it's actually necessary for participants to receive feedback on how they performed in the test (e.g., whether they demonstrated any biases). If this isn't necessary, perhaps it would be better not to provide people with this feedback (unless, perhaps, they specifically ask for it). It seems that you're potentially setting people up to receive information that may be challenging, and it might not even be necessary to do so?

- It seems that, aside from the issue of feedback, even taking part in the exercises could be challenging (e.g., people are being asked to rate whether homosexuality is "sickening", among other things, which could be distressing in itself, e.g., if the respondent is homosexual themselves). Perhaps the challenging nature of the exercises needs to be made clearer in the invitation letter.

Major amendments required (for reviewer):

Confirmation of making the above minor amendments (for students):

I have noted and made all the required minor amendments, as stated above, before starting my research and collecting data.

Student's name (*Typed name to act as signature*): Nicholas Hearn
Student number: u1525461

Date: 09/01/2018

(Please submit a copy of this decision letter to your supervisor with this box completed, if minor amendments to your ethics application are required)

ASSESSMENT OF RISK TO RESEACHER (for reviewer)

Has an adequate risk assessment been offered in the application form?

YES

Please request resubmission with an adequate risk assessment

If the proposed research could expose the researcher to any of kind of emotional, physical or health and safety hazard? Please rate the degree of risk:

☐ HIGH

Please do not approve a high risk application and refer to the Chair of Ethics. Travel to countries/provinces/areas deemed to be high risk should not be permitted and an application not approved on this basis. If unsure please refer to the Chair of Ethics.

☐ MEDIUM (Please approve but with appropriate recommendations)

☒ LOW

Reviewer comments in relation to researcher risk (if any).

Reviewer (Typed name to act as signature):

Date:

This reviewer has assessed the ethics application for the named research study on behalf of the School of Psychology Research Ethics Committee

RESEARCHER PLEASE NOTE:

For the researcher and participants involved in the above named study to be covered by UEL's Insurance, prior ethics approval from the School of Psychology (acting on behalf of the UEL Research Ethics Committee), and confirmation from students where minor amendments were required, must be obtained before any research takes place.

For a copy of UELs Personal Accident & Travel Insurance Policy, please see the Ethics Folder in the Psychology Noticeboard

Appendix C: Study Advertisement

The following message was posted on the social media websites Facebook, Twitter, and Reddit. Variants of the message were also shared in private correspondence to personal contacts via email:

Please help out with research on Implicit Bias towards minority groups by taking this online test. I'm researching how people in the UK differ in the automatic associations they make with certain categories (sexuality, (trans-) gender, weight, age, skin colour).

Link: <http://www.virtuallab.org.uk/nhiat/>

You can take up to 5 tests, and your result will be displayed after each. The order of the tests is randomised. After entering some initial (anonymous) information about yourself, each test takes around 5 minutes to complete. You'll need to tap a couple of buttons so will require a laptop or desktop computer.

Participants must be living in the UK and be over 18. Please read the information sheet on the first page for further details and feel free to ask me any questions about the study.

Thank you for your help!

Appendix D: Participant Information Sheet

Participant Information Sheet

Project Title

Implicit Bias in the UK: Updating the Implicit Association Test

Researcher: Nick Hearn

The purpose of this page is to provide you with the information that you need to consider in deciding whether to participate in this online study.

Introduction

I would like to invite you to take part in a research study. The study is part of my Professional Doctorate in Clinical Psychology. Before you decide, you need to understand why the research is being conducted and what it will involve. Please read through the following information before deciding if you would like to take part in the research. Talk to others about the study if you wish. If something needs clarification or you have any unanswered questions, please do not hesitate to contact me using the details on this form.

What are the aims of the study?

Bias is a tendency to prefer one person or thing over another. Biases we are not aware of can affect our behaviour. This study uses newly developed materials which aim to improve our understanding of implicit attitudes towards groups of people. The data gathered in this study will allow a comparison between participants from the UK general population with a sample of (trainee) clinical psychologists. The findings from this research may help raise awareness of the prevalence of implicit biases and the implications for clinical psychology practice.

Why do you want me to take part?

You have been asked to take part because we would like to gain an understanding of implicit attitudes among psychologists and non-psychologists. To take part in the study, you will need to be at least 18 years of age, live in the UK and have enough fluency in English to understand and respond to written and verbal instructions.

Do I have to take part?

No, taking part is entirely your choice. If you do decide to take part, you can withdraw from the study at any time without giving a reason. If you have not finished any of the tasks yet you can withdraw by closing the browser window and your data will be deleted. If you have already completed part of the study, you can contact the researcher with your study identifier so that your data can be deleted. You do not have to give a reason. You will be able to withdraw up until the end of April 2018 when the data analysis for this study will be finalised.

What would taking part involve?

If you decide to take part, you will be asked to provide some general information about yourself and to complete at least one of five Implicit Associations Tests (IAT). These tests aim to measure attitudes towards skin colour, weight, age, sexuality and gender. It is estimated that the study will take between 10 and 35 minutes depending on how many tests you decide to do.

Are there any disadvantages or risks to taking part?

You will be asked to pair positive and negative words together with certain groups for each task. Some people may find the pairings they are asked to make challenging and may feel uncomfortable associating certain words with groups of people. At the end of each section you will receive a summary of your results with possible interpretations based on the research that has already been done. However, the University of East London and the researchers involved in this study make no claim for the validity of these suggested interpretations. Some people may find these interpretations challenging. Information about sources of support will also be provided should you find the suggested interpretations distressing.

Are there any benefits to taking part and what will happen to the results?

Taking part will help develop our understanding of implicit bias among the UK general population, as well as UK psychologists. This may have implications for training and improvements in clinical practice. In appreciation of your contribution, you will also be invited to enter a prize draw to win a £20 Amazon voucher. The results of the study will be written up as a doctoral thesis and submitted to an academic journal. The results may also be used in conference presentations. All the information you provide will remain anonymous. All the data collected as part of this study will be destroyed after 5 years.

Will my information remain confidential?

All the information you provide will remain confidential and the study database will only be shared with the researcher and supervisor. No personally identifiable information will be collected as part of the study. You will be assigned a unique identifying number which will be displayed on the first page of the study. You are encouraged to write it down. This number will be stored in the study database where your responses will be recorded. It will be the only way in which your data can be linked to you if you wish to withdraw from the study. The database will be stored in a password protected secure network folder.

Contact details required to enter the prize draw (i.e. email address) will be stored separately from the research database and will not be linked to your unique study identifier. A cookie will also be saved on your computer. Cookies are small text files saved on your computer when you first visit a website. They help websites recognise you when you come back. The cookie saved on your computer will only store your study identifier and progress information. Your responses will not be stored in this cookie. The use of cookies is necessary to ensure you are not asked to complete the same test more than once and to enable you to complete the tests over more than one session if you choose to.

Thank you for taking the time to read this information. Please save or print this information for your records.

If you would like to take part in the study, please click continue.

Who can I contact about the study?

If you have any further questions about the study, please contact:

Researcher:

Nick Hearn, Trainee Clinical Psychologist,

School of Psychology, University of East London, Water Lane, London E15 4LZ

Email: u1525461@uel.ac.uk

For concerns or complaints about how the study has been conducted, please contact:

Supervisor:

[REDACTED]

School of Psychology, University of East London, Water Lane, London E15 4LZ

Email:

[REDACTED]

Chair of the School of Psychology Research Ethics Sub-committee:

Dr Mary Spiller,

School of Psychology, University of East London, Water Lane, London E15 4LZ

Email: m.j.spiller@uel.ac.uk

Tel: 020 8223 4004

Appendix E: Consent Form

Consent to participate in a research study

Implicit Bias in the UK: Updating the Implicit Association Test

- ☐ I confirm I have read and understood the information page.
- ☐ I have been given the opportunity to ask questions about the study and have received satisfactory answers.
- ☐ I understand that my involvement in the study is voluntary.
- ☐ I understand that I can withdraw from the study up to the end of April 2018 without giving a reason.
- ☐ I understand that if I withdraw during the study all the information I provided will be deleted.
- ☐ I understand that I will not be able to withdraw my responses for completed tests if I am unable to provide my unique study identifier.
- ☐ I understand that the data I provide will be anonymous and will be confidential between the researcher and supervisor.
- ☐ I understand that a cookie will be installed on my computer to record my progress through the study and that it will not store any of my responses.
- ☐ I understand that all information about the study will be destroyed after 5 years.

I hereby freely and fully consent to participate in the study, which has been fully explained to me. Please indicate your consent by clicking 'YES' below.

Appendix F: Debrief Form

Implicit Bias in the UK: Updating the Implicit Association Test Debrief [Example for Trans IAT]

The test you just completed is called the Implicit Association Test. You categorised good and bad words with representations of trans- and cisgender people.

Here is your result:

The data suggest a slight automatic preference for cisgender (non-trans) people over transgender people.

Your result is described as an “automatic preference for cisgender people over transgender people” if you were faster responding when *cis* and *good* are assigned to the same response key than when *trans* and *good* are classified with the same key. Your score is described as an “automatic preference for transgender people over cisgender people” if the opposite occurred.

Your automatic preference may be described as: “slight”, “moderate”, “strong” or “no preference”. This indicates the strength of your automatic preference. The IAT requires a certain number of correct responses to provide results. If you made too many errors, you will get the feedback that there were too many errors to determine a result.

Note that the IAT result is based on the sorting task and not on the questions that you answered.

If you have questions about your IAT performance or score, please visit <https://implicit.harvard.edu/implicit/iatdetails.html>. There you will find answers to frequently asked questions, links to related research and additional information about implicit associations. You may also email me with questions or comments at u1525461@uel.ac.uk.

Thank you for your participation

If you would like to be entered into a random prize draw for a £20 Amazon voucher, please enter your email address or phone number.

(This information will not be linked to your study responses)

Sources of support

If you feel distressed during or after the study, I encourage you to discuss this with your GP. You could also discuss this with the clinician who is supporting you if you are accessing mental health services.

The following charities may also be useful for you:

- Samaritans - provide 24-hour support if you would like to talk to someone about how you are feeling.
Contact number- 116 123
Website- www.samaritans.org
- Mind - provide information and support about mental health problems from 9am-6pm Monday-Friday.
Contact number- 0300 123 3393
Website- www.mind.org.uk
- Sane - provide a national out-of-hours helpline (from 6pm-11pm) for individuals experiencing distress.
Contact number- 0300 304 7000
Website- www.sane.org.uk
- A detailed list of other self-help organisations can be found at:
www.self-help.org.uk

In an emergency please call for an ambulance or go to your nearest A&E department

Please save or print this information for your records.

Appendix G: IAT Stimuli

Skin-tone IAT

Category	Items
----------	-------

Good	“Happy”, “Lovely”, “Beautiful”, “Pleasing”, “Appealing”, “Fantastic”
------	--

Bad	“Grief”, “Rotten”, “Nasty”, “Ugly”, “Sadness”, “Tragic”
-----	---

Dark-skin



Light-skin



Age-IAT

Category	Items
----------	-------

Good	“Lovely”, “Glorious”, “Spectacular”, “Delight”, “Happy”, “Enjoy”
------	--

Bad	“Annoy”, “Distrust”, “Poison”, “Awful”, “Selfish”, “Hurtful”
-----	--

Old	
-----	--



Young	
-------	--



Sexuality-IAT

Category Items

Good “Cherish”, “Appealing”, “Magnificent”, “Joyous”, “Cheerful”, “Glad”

Bad “Sickening”, “Horrific”, “Sadness”, “Negative”, “Pain”, “Abuse”

Gay



Straight



Weight-IAT

Category	Items
----------	-------

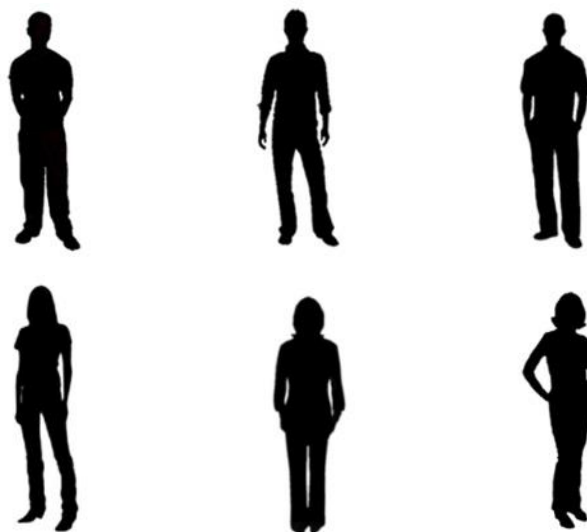
Good	“Cherish”, “Friendship”, “Triumph”, “Delightful”, “Enjoy”, “Celebrate”
------	--

Bad	“Angry”, “Distrust”, “Evil”, “Nasty”, “Negative”, “Grief”
-----	---

Fat



Thin



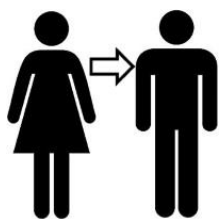
Gender Identity-IAT

Category Items

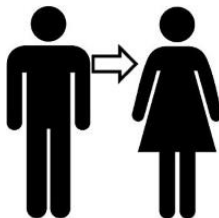
Good “Marvellous”, “Superb”, “Pleasure”, “Joyful”, “Glorious”, “Wonderful”

Bad “Horrible”, “Agony”, “Humiliate”, “Nasty”, “Terrible”, “Awful”

Transgender

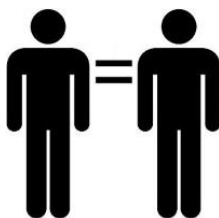


, “Transgender men”, “Trans man”

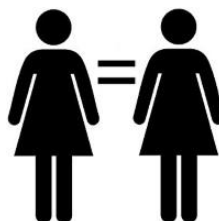


, “Transgender women”, “Trans woman”

Cisgender



, “Cisgender men”, “Cis man”



, “Cisgender women”, “Cis woman”

Appendix H: Self-rated Attitudes

Skin-Tone Feelings Thermometer

How warm or cold do you feel towards

Dark skinned People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

How warm or cold do you feel towards

Light skinned People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

Age Feelings Thermometer

How warm or cold do you feel towards

Old People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

How warm or cold do you feel towards

Young People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

Sexuality Feelings Thermometer

How warm or cold do you feel towards

Gay People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

How warm or cold do you feel towards

Straight People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

Weight Feelings Thermometer

How warm or cold do you feel towards

Fat People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

How warm or cold do you feel towards

Thin People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

Gender Identity Feelings Thermometer

How warm or cold do you feel towards

Transgender People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

How warm or cold do you feel towards

Cisgender People?

- 10 – Extremely Warm
- 9 – Very Warm
- 8 – Moderately Warm
- 7 – Somewhat Warm
- 6 – Slightly Warm
- 5 - Neither Warm nor Cold
- 4 – Slightly Cold
- 3 – Somewhat Cold
- 2 – Moderately Cold
- 1 – Very Cold
- 0 – Extremely Cold

Appendix I: IAT Procedure

The IAT administration procedure used in this study was made up of seven trial blocks (see Table 2). The sequence is described below using the example of the sexuality IAT:

Block 1: Twenty trials.

Participants are trained to press the “E” key (left) on their keyboard when shown images of gay people and the “I” (right) key for images of straight people.

Block 2: Twenty trials.

Another training block: Participants learn to press the “E” key when presented with “bad” words (e.g., horrific) and the “I” key for “good” words (e.g., appealing).

Block 3 and 4: Forty-one trials each.

These combine the category and attribute discrimination procedures above. Thus, when either images of gay people or “bad” words appear on the screen, participants should thus press the left key.

Block 5: Twenty trials.

A further training block. Participants are trained to reverse previously assigned keys and concepts, e.g., they are now required to press the left key when a “good” word appears.

Block 5 and 6: Forty-one trials each.

These blocks are a reversal of blocks 3 and 4: Participants are required to press the left key when “good” words or images of gay people are presented.

Appendix J: Age Distribution

Figure 1: Histogram of General Population Age Distribution

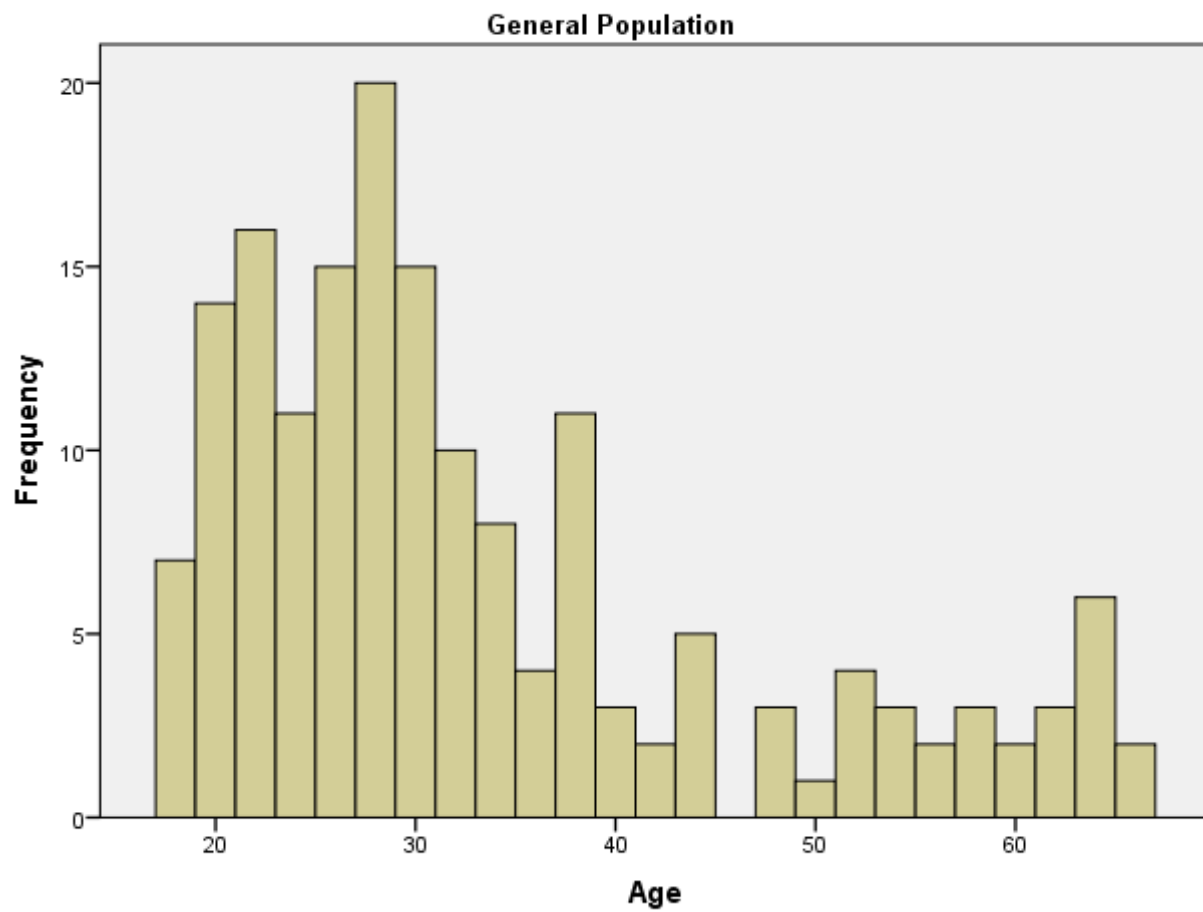


Figure 2: Histogram of Trainee Clinical Psychologist Age Distribution



Figure 3: Boxplot of Age Distribution

